
CITY MULTI® H2i® Y-SERIES HYPER-HEATING INVERTER SYSTEM DESIGN

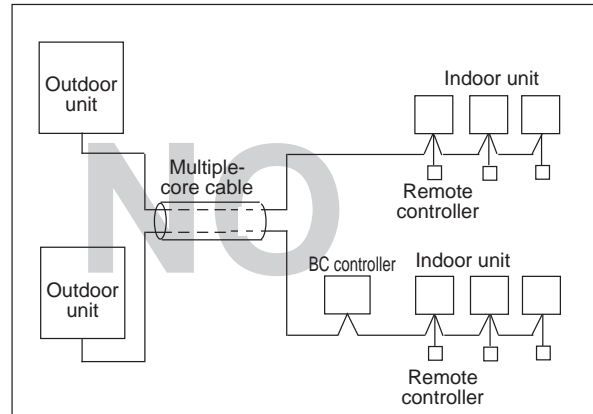
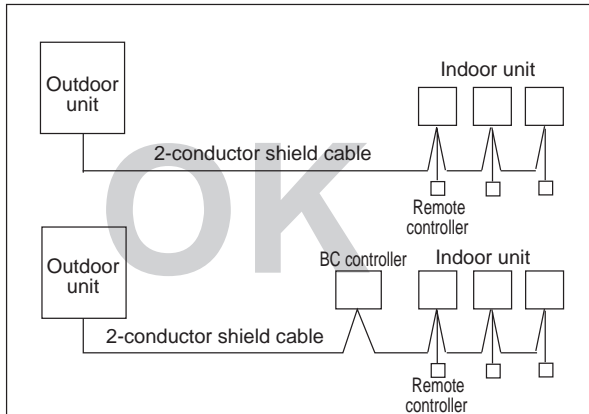
2010 H2i®
Y-SERIES
SYSTEM DESIGN

1. ELECTRICAL WORK	H2iSD-2
1-1. General Cautions	H2iSD-2
1-2. Power Supply for Indoor Unit and Outdoor Unit.....	H2iSD-3
2. M-NET CONTROL.....	H2iSD-6
2-1. Transmission Cable Length Limitation	H2iSD-6
2-2. Transmission Cable Specifications	H2iSD-7
2-3. System Configuration Restrictions	H2iSD-8
2-4. Address Setting.....	H2iSD-11
3. PIPING DESIGN	H2iSD-22
3-1. R410A Piping Material.....	H2iSD-22
3-2. PUHY-HP-T/Y(S)JMU's Piping Design.....	H2iSD-23
3-3. Refrigerant Charge Calculation.....	H2iSD-25
4. INSTALLATION	H2iSD-26
4-1. Installation Site Requirements	H2iSD-26
4-2. Installation Clearance Space	H2iSD-27
4-3. Piping Direction	H2iSD-29
4-4. Weather Countermeasures	H2iSD-34
4-5. Low Ambient Kit Application Guidelines	H2iSD-35
5. STANDARD AND SEACOAST PROTECTION (-BS) TREATMENT	H2iSD-37
5-1. H2i Y-Series	H2iSD-37
6. CAUTIONS.....	H2iSD-38
6-1. Refrigerant Properties	H2iSD-38
6-2. Confirm the Critical Concentration and Perform Countermeasures.....	H2iSD-38

1. ELECTRICAL WORK

1-1. General Cautions

- ① Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations, and guidance of each electric power company.
- ② Wiring for control (hereinafter referred to as transmission cable) shall be (50mm[1-5/8in] or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert transmission cable and power source wire in the same conduit.)
- ③ Be sure to provide designated grounding work to outdoor unit.
- ④ Give some allowance to wiring for electrical part box of indoor and outdoor units, because the box is sometimes removed at the time of service work.
- ⑤ Never connect 100V, 208~230,460V power source to terminal block of transmission cable. If connected, electrical parts will be burnt out.
- ⑥ Use 2-conductor shield cable for transmission cable. If transmission cables of different systems are wired with the same multicore cable, the resultant poor transmitting and receiving will cause erroneous operations.



1. ELECTRICAL WORK

1-2. Power Supply for Indoor and Outdoor Units

1-2-1. Electrical Characteristics of the Indoor Units

Symbols: MCA : Min.Circuit Amps (=1.25xFLA) FLA : Full Load Amps					
			IFM :Indoor Fan Motor	Output : Fan motor rated output	
Model	Indoor Unit			IFM	
	Hz	Volts	Voltage range	MCA(A)	FLA(A)
PLFY-P08NCMU-E	60Hz	208 / 230V	188 to 253V	0.29 / 0.29	0.23 / 0.23
PLFY-P12NCMU-E				0.35 / 0.35	0.28 / 0.28
PLFY-P15NCMU-E				0.35 / 0.35	0.28 / 0.28
PLFY-P12NBMU-E				0.64 / 0.64	0.51 / 0.51
PLFY-P15NBMU-E				0.64 / 0.64	0.51 / 0.51
PLFY-P18NBMU-E				0.64 / 0.64	0.51 / 0.51
PLFY-P24NBMU-E				0.64 / 0.64	0.51 / 0.51
PLFY-P30NBMU-E				0.64 / 0.64	0.51 / 0.51
PLFY-P36NBMU-E				1.25 / 1.25	1.00 / 1.00
PMFY-P06NBMU-E	60Hz	208 / 230V	188 to 253V	0.25 / 0.25	0.20 / 0.20
PMFY-P08NBMU-E				0.25 / 0.25	0.20 / 0.20
PMFY-P12NBMU-E				0.26 / 0.26	0.21 / 0.21
PMFY-P15NBMU-E				0.33 / 0.33	0.26 / 0.26
PEFY-P06NMAU-E	60Hz	208 / 230V	188 to 253V	1.05 / 1.05	0.84 / 0.84
PEFY-P08NMAU-E				1.05 / 1.05	0.84 / 0.84
PEFY-P12NMAU-E				1.21 / 1.21	0.97 / 0.97
PEFY-P15NMAU-E				1.45 / 1.45	1.16 / 1.16
PEFY-P18NMAU-E				1.56 / 1.56	1.25 / 1.25
PEFY-P24NMAU-E				2.25 / 2.25	1.80 / 1.80
PEFY-P27NMAU-E				2.49 / 2.49	1.99 / 1.99
PEFY-P30NMAU-E				2.50 / 2.50	2.00 / 2.00
PEFY-P36NMAU-E				3.33 / 3.33	2.66 / 2.66
PEFY-P48NMAU-E				3.41 / 3.41	2.73 / 2.73
PEFY-P54NMAU-E				3.31 / 3.31	2.65 / 2.65
PEFY-P06NMSU-E	60Hz	208 / 230V	188 to 253V	0.47 / 0.50	0.32 / 0.31
PEFY-P08NMSU-E				0.47 / 0.50	0.41 / 0.39
PEFY-P12NMSU-E				0.68 / 0.74	0.46 / 0.43
PEFY-P15NMSU-E				1.20 / 1.33	0.47 / 0.45
PEFY-P18NMSU-E				1.20 / 1.33	0.64 / 0.60
PEFY-P24NMSU-E				1.57 / 1.73	0.88 / 0.83
PEFY-P15NMHU-E				1.20 / 1.33	0.96 / 1.06
PEFY-P18NMHU-E				1.20 / 1.33	0.96 / 1.06
PEFY-P24NMHU-E				1.57 / 1.73	1.25 / 1.38
PEFY-P27NMHU-E				1.72 / 1.89	1.37 / 1.51
PEFY-P30NMHU-E				2.08 / 2.29	1.66 / 1.83
PEFY-P36NMHU-E				4.23 / 4.67	3.38 / 3.73
PEFY-P48NMHU-E				4.23 / 4.67	3.38 / 3.73
PEFY-P54NMHU-E				4.29 / 4.73	3.43 / 3.78
PEFY-P72NMHU-E				5.60 / 6.18	4.48 / 4.94
PEFY-P96NMHU-E				7.12 / 7.85	5.69 / 6.28

1. ELECTRICAL WORK

2010 H2i®
Y-SERIES
SYSTEM DESIGN

Symbols: MCA : Min.Circuit Amps (=1.25xFLA) FLA : Full Load Amps					
IFM :Indoor Fan Motor					
Model	Indoor Unit			IFM	
	Hz	Volts	Voltage range	MCA(A)	FLA(A)
PCFY-P15NKMU-E	60Hz	208 / 230V	188 to 253V	0.44 / 0.44	0.35 / 0.35
PCFY-P24NKMU-E				0.52 / 0.52	0.41 / 0.41
PCFY-P30NKMU-E				1.22 / 1.22	0.97 / 0.97
PCFY-P36NKMU-E				1.22 / 1.22	0.97 / 0.97
PKFY-P06NBMU-E	60Hz	208 / 230V	188 to 253V	0.19 / 0.19	0.15 / 0.15
PKFY-P08NBMU-E				0.19 / 0.19	0.15 / 0.15
PKFY-P12NHMU-E				0.38 / 0.38	0.30 / 0.30
PKFY-P15NHMU-E				0.38 / 0.38	0.30 / 0.30
PKFY-P18NHMU-E				0.38 / 0.38	0.30 / 0.30
PKFY-P24NKMU-E				0.37 / 0.37	0.29 / 0.29
PKFY-P30NKMU-E				0.54 / 0.54	0.43 / 0.43
PFFY-P06NEMU-E	60Hz	208 / 230V	188 to 253V	0.32 / 0.34	0.25 / 0.27
PFFY-P08NEMU-E				0.32 / 0.34	0.25 / 0.27
PFFY-P12NEMU-E				0.34 / 0.38	0.27 / 0.30
PFFY-P15NEMU-E				0.40 / 0.44	0.32 / 0.35
PFFY-P18NEMU-E				0.48 / 0.53	0.38 / 0.42
PFFY-P24NEMU-E				0.59 / 0.64	0.47 / 0.51
PFFY-P06NRMU-E	60Hz	208 / 230V	188 to 253V	0.32 / 0.34	0.25 / 0.27
PFFY-P08NRMU-E				0.32 / 0.34	0.25 / 0.27
PFFY-P12NRMU-E				0.34 / 0.38	0.27 / 0.30
PFFY-P15NRMU-E				0.40 / 0.44	0.32 / 0.35
PFFY-P18NRMU-E				0.48 / 0.53	0.38 / 0.42
PFFY-P24NRMU-E				0.59 / 0.64	0.47 / 0.51
PVFY-P12E00A	60Hz	208 / 230V	188 to 253V	0.56 / 0.50	0.45 / 0.40
PVFY-P18E00A				1.53 / 1.38	1.22 / 1.10
PVFY-P24E00A				1.39 / 1.85	1.11 / 1.00
PVFY-P30E00A				2.50 / 2.25	2.00 / 1.80
PVFY-P36E00A				2.09 / 1.88	1.67 / 1.50
PVFY-P48E00A				2.23 / 2.00	1.78 / 1.60
PVFY-P54E00A				2.64 / 2.38	2.11 / 1.90
PWFY-P36NMU-E-BU	60Hz	208 / 230V	188 to 253V	25	-
PWFY-P36NMU-E-AU				0.09	-
PWFY-P72NMU-E-AU				0.09	-

1. ELECTRICAL WORK

1-2-2. Electrical characteristics of Outdoor unit of cooling mode

Symbols: MCA : Min. Circuit Amps MOCP : Max. Over Current Protection
 SC : Starting Current RLA : Rated Load Amps

PUHY-HP-T(S)JMU

Model	Unit Combination	Hz	Volts	Voltage range	Outdoor Units				Compressor	Fan
					RLA(A)	RLA(MAX)(A)	MCA(A)	MOCP	SC(A)	Output(kW)
PUHY-HP72TJMU-A		60Hz	208 / 230V	188 to 253V	19.4 / 17.6	38.4 / 38.4	59 / 54	101 / 92	15	0.92
PUHY-HP96TJMU-A		60Hz	208 / 230V		28.2 / 25.5	52.4 / 52.4	74 / 68	127 / 116	15	0.92
PUHY-HP 144TSJMU-A	PUHY-HP72TJMU-A	60Hz	208 / 230V		19.4 / 17.6	38.4 / 38.4	59 / 54	101 / 92	15	0.92
	PUHY-HP72TJMU-A	60Hz	208 / 230V		19.4 / 17.6	38.4 / 38.4	59 / 54	101 / 92	15	0.92
PUHY-HP 192TSJMU-A	PUHY-HP96TJMU-A	60Hz	208 / 230V		28.2 / 25.5	52.4 / 52.4	74 / 68	127 / 116	15	0.92
	PUHY-HP96TJMU-A	60Hz	208 / 230V		28.2 / 25.5	52.4 / 52.4	74 / 68	127 / 116	15	0.92

To size breakers, see "Recommended Fuse/Breaker Size" in the Specifications table.

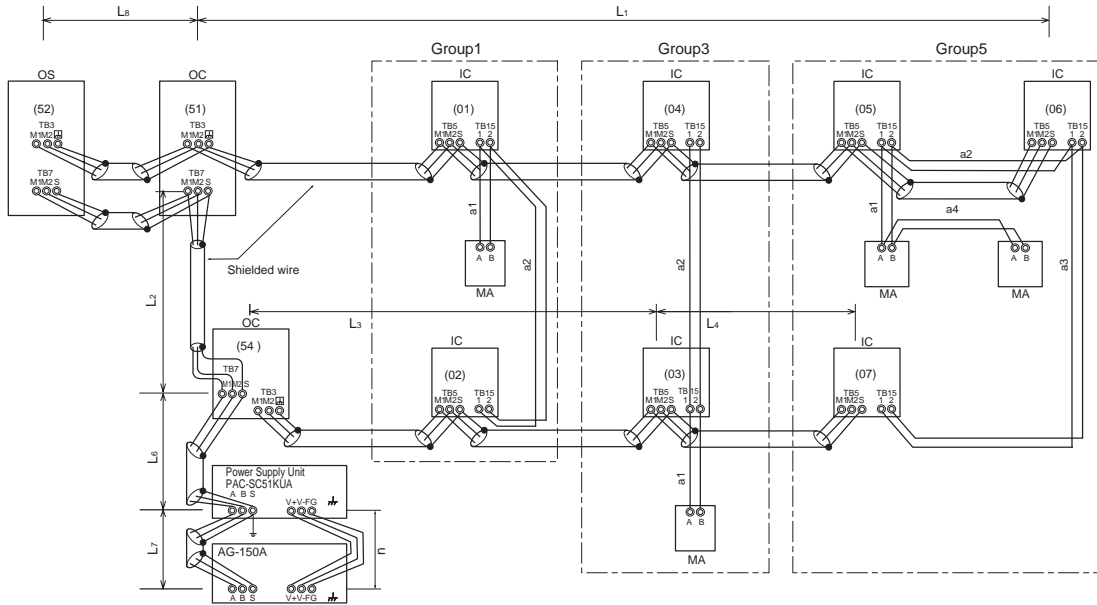
2010 H2i[®]
 Y-SERIES
 SYSTEM DESIGN

2-1. Transmission Cable Length Limitations

2-1-1. Using MA Remote controller

Long transmission cable causes voltage down, therefore, the length limitation should be obeyed to secure proper transmission.

Max. length via Outdoor (M-NET cable)	$L_1+L_2+L_3+L_4, L_1+L_2+L_6+L_7, L_3+L_4+L_6+L_7$	$\leq 500\text{m}[1640\text{ft.}]$	1.25mm^2 [AWG16] or thicker
Max. Total M-NET Wiring	$(L_1 \quad 8)$	$\leq 2\text{km}[6,560\text{ft.}]$	1.25mm^2 [AWG16] or thicker
Max. length to Outdoor (M-NET cable)	$L_1+L_8, L_3+L_4, L_6, L_2+L_6+L_8, L_7$	$\leq 200\text{m}[656\text{ft.}]$	1.25mm^2 [AWG16] or thicker
Max. length from MA to Indoor	$a_1+a_2, a_1+a_2+a_3+a_4$	$\leq 200\text{m}[656\text{ft.}]$	$0.3\text{-}1.25\text{mm}^2$ [AWG22-16]
24VDC to AG-150A	n	$\leq 50\text{m}[164\text{ft.}]$	$0.75\text{-}2.0\text{mm}^2$ [AWG18-14]



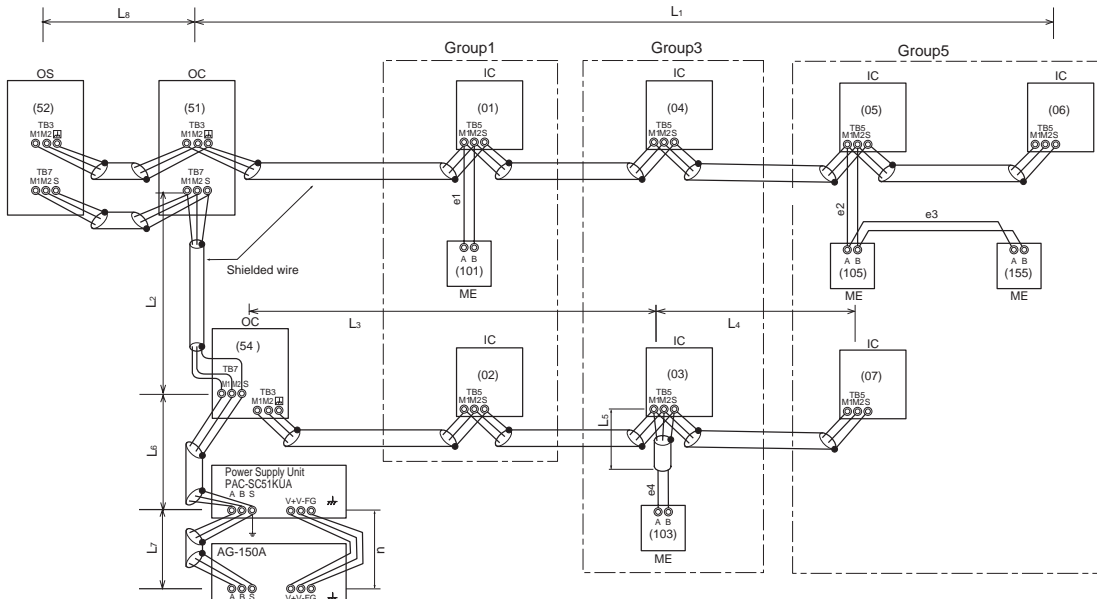
OC, OS : Outdoor unit controller; IC: Indoor unit controller; MA: MA remote controller

2-1-2. Using ME Remote controller

Long transmission cable causes voltage down, therefore, the length limitation should be obeyed to secure proper transmission.

Max. length via Outdoor (M-NET cable)	$L_1+L_2+L_3+L_4, L_1+L_2+L_6+L_7, L_1+L_2+L_3+L_5, L_3+L_4+L_6+L_7$	$\leq 500\text{m}[1640\text{ft.}]$	1.25mm^2 [AWG16] or thicker
Max. Total M-NET Wiring	$(L_1 \quad 8)$	$\leq 2\text{km}[6,560\text{ft.}]$	1.25mm^2 [AWG16] or thicker
Max. length to Outdoor (M-NET cable)	$L_1+L_8, L_3+L_4, L_6, L_2+L_6+L_8, L_7, L_3+L_5$	$\leq 200\text{m}[656\text{ft.}]$	1.25mm^2 [AWG16] or thicker
Max. length from ME to Indoor	e_1, e_2+e_3, e_4	$\leq 10\text{m}[32\text{ft.}]^*1$	$0.3\text{-}1.25\text{mm}^2$ [AWG22-16] *1
24VDC to AG-150A	n	$\leq 50\text{m}[164\text{ft.}]$	$0.75\text{-}2.0\text{mm}^2$ [AWG18-14]

*1. If the length from ME to Indoor exceed 10m [33ft.], use 1.25mm^2 [AWG16] shielded cable, but the total length should be counted into Max. length via Outdoor.



OC, OS : Outdoor unit controller; IC: Indoor unit controller; ME: ME remote controller

2. M-NET CONTROL

2-2. Transmission Cable Specifications

	Transmission cables (Li)	ME Remote controller cables	MA Remote controller cables
Type of cable	Shielding wire (2-core) CVVS, CPEVS or MVVS	Sheathed 2-core cable (unshielded) CVV	
Cable size	1.25mm ² [AWG16]	1.25mm ² [AWG16] 1.25mm ² [AWG16]*1	1.25mm ² [AWG16] 1.25mm ² [AWG16]*1
Remarks	—	When 10m [32ft] is exceeded, use cables with the same specification as transmission cables.	Max length : 200m [656ft]

*1 Connected with simple remote controller.

CVVS, MVVS : PVC insulated PVC jacketed shielded control cable
 CPEVS : PE insulated PVC jacketed shielded communication cable
 CVV : PV insulated PVC sheathed control cable

2010 H2i[®]
 Y-SERIES
 SYSTEM DESIGN

2-3. System Configuration Restrictions

2-3-1. Common restrictions for the CITY MULTI system

For each Outdoor unit, the maximum connectable quantity of Indoor unit is specified at its Specifications table.

- A) 1 Group of Indoor units can have 1-16 Indoor units;
- B) Maximum 2 remote controllers for 1 Group; (MA/ME remote controllers cannot be present together in 1group.)
- C) 1 LOSSNAY unit can interlock maximum 16 Indoor units; 1 Indoor unit can interlock only 1 LOSSNAY unit.
- D) Maximum 3 System controllers are connectable when connecting to TB3 of the Outdoor unit.
- E) Maximum 3 System controllers are connectable when connecting to TB7 of the Outdoor unit, if the transmission power is supplied by the Outdoor unit.
- F) 4 System controllers or more are connectable when connecting to TB7 of the Outdoor unit, if the transmission power is supplied by the power supply unit PAC-SC51KUA. Details refer to 2-3-3-C.

*System controller connected as described in D) and E) would have a risk that the failure of connected Outdoor unit would stop power supply to the System controller.

2-3-2. Ensuring proper communication power for M-NET

In order to ensure proper communication among Outdoor unit, Indoor unit, LOSSNAY and Controllers, the transmission power situation for the M-NET should be observed. In some cases, Transmission booster should be used. Taking the power consumption index of Indoor unit sized P06-P54 as 1, the equivalent power consumption index and supply capability index of others are listed at Table 2-3-1 and Table 2-3-2.

Table 2-3-1 The equivalent power consumption by index Indoor units, LOSSNAY, controllers

Indoor, OA unit	Indoor unit	BC controller	MA RC.LOSSNAY	ME Remote Contr.	Timers, System Contr.		ON/OFF Contr.	MN Converter		
Sized P06-P54	Sized P72, P96	CMB	PAR-21MAA PAC-YT51CRB PAR-FA32MA LGH-RX-E PZ-41SLB	PAR-F27MEA PZ-52SF	PAC-SF44SRA PAC-YT34STA AG-150A	TC-24A	GB-24A	PAC-YT40ANRA	CMS -MNF-B	CMS -MNG-E
1	7	2	0	1/4	1/2	4	3	1	1/2	2

*RC : Remote Controller

Table 2-3-2 The equivalent power supply capability index of Trans.Booster, Power supply unit, Connector TB3, TB7 of Outdoor unit.

Transmission Booster	Power supply unit	BM ADAPTER	System Controller	Outdoor unit	Outdoor unit
PAC-SF46EPA	PAC-SC51KUA	BAC-HD150	GB-50ADA	Connector TB3 and TB7 total *	Connector TB7 only
25	5	6	6	32	6

*If PAC-SC51KUA is used to supply power at TB7 side, no power supply need from Outdoor unit at TB7, Connector TB3 itself will therefore have 32.
Not applicable to the PUMY model.

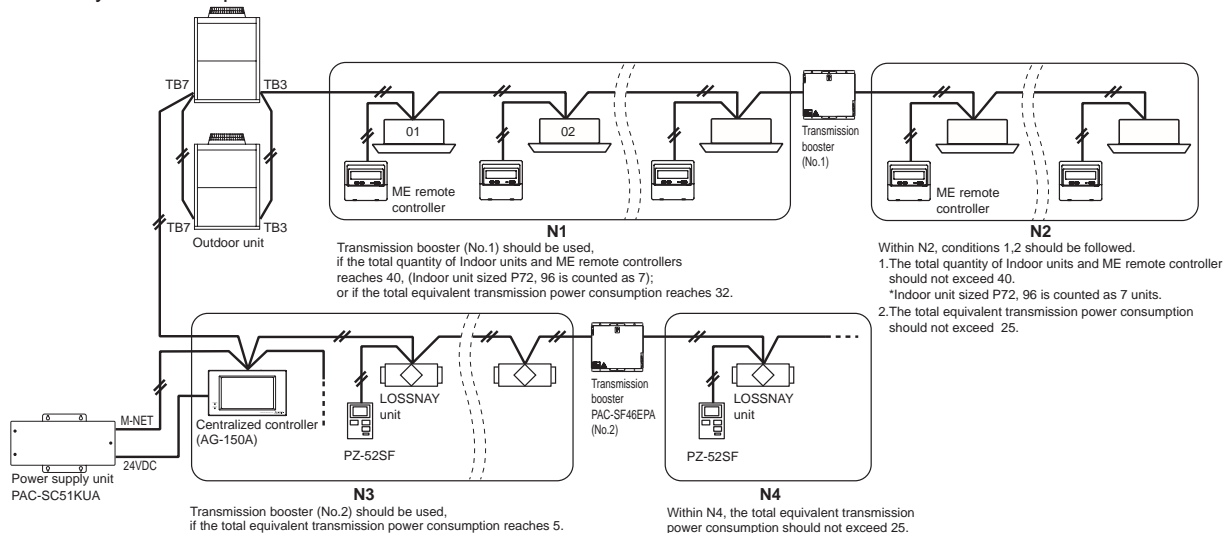
With the equivalent power consumption values in Table 2-3-1 and Table 2-3-2, PAC-SF46EPA can be designed into the air-conditioner system to ensure proper system communication according to 2-3-2-A, B, C.

2-3-2-A) Firstly, count from TB3 at TB3 side the total quantity of Indoor units and ME remote controller, Timers and System controllers. If the total quantity reaches 40, a PAC-SF46EPA should be set. In this case, Indoor unit sized P72, 96 is counted as 7 Indoor units, but MA remote controller(s), LOSSNAY is NOT counted.

2-3-2-B) Secondly, count from TB7 side to TB3 side the total transmission power consumption index. If the total power consumption reaches 32, a PAC-SF46EPA should be set. Yet, if a PAC-SC51KUA is used to supply power at TB7 side, count from index TB3 side only.

2-3-2-C) Thirdly, count from TB7 at TB7 side the total transmission power consumption index, If the total power consumption reaches 6, a PAC-SF46EPA should be set.

■ System example



2. M-NET CONTROL

2-3-3. Ensuring proper power supply to System controller

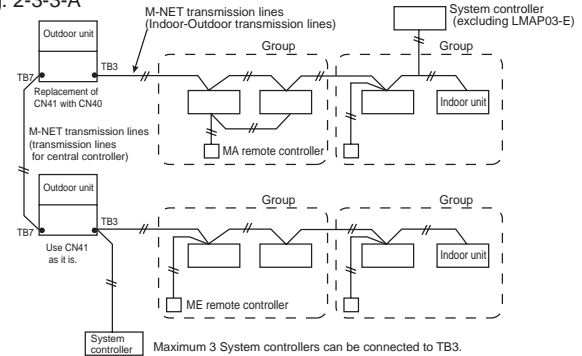
The power to System controller (excluding LMAP03-U) is supplied via M-NET transmission line. M-NET transmission line at TB7 side is called Central control transmission line while one at TB3 side is called Indoor-Outdoor transmission line. There are 3 ways to supply power to the System controller .

- Connecting to TB3 of the Outdoor unit and receiving power from the Outdoor unit.
- Connecting to TB7 of the Outdoor unit and receiving power from the Outdoor unit.
- Connecting to TB7 of the Outdoor unit but receiving power from power supply unit PAC-SC51KUA.

2-3-3-A. When connecting to TB3 of the Outdoor unit and receiving power from the Outdoor unit.

Maximum 3 System controllers can be connected to TB3. If there is more than 1 Outdoor unit, it is necessary to replace power supply switch connector CN41 with CN40 on one Outdoor unit.

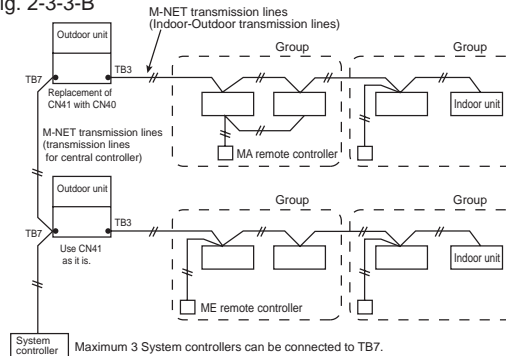
Fig. 2-3-3-A



2-3-3-B. When connecting to TB7 of the Outdoor unit and receiving power from the Outdoor unit.

Maximum 3 System controllers can be connected to TB7 and receiving power from the Outdoor unit. It is necessary to replace power supply switch connector CN41 with CN40 on one Outdoor unit.

Fig. 2-3-3-B

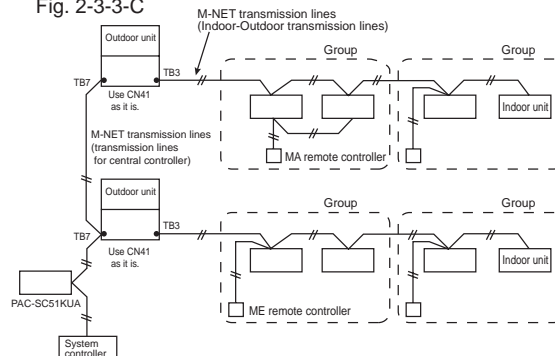


2-3-3-C. When connecting to TB7 of the Outdoor unit but receiving power from PAC-SC51KUA.

When using PAC-SC51KUA to supply transmission power, the power supply connector CN41 on the Outdoor units should be kept as it is. It is also a factory setting. 1 PAC-SC51KUA supports maximum 1 AG-150A unit due to the limited power 24VDC at its TB3. However, 1 PAC-SC51KUA supplies transmission power at its TB2 equal to 5 Indoor units, which is referable at Table 2-3-2.

If PZ-52SF, Timers, System controller, ON/OFF controller connected to TB7 consume transmission power more than 5 (Indoor units), Transmission booster PAC-SF46EPA is needed. PAC-SF46EPA supplies transmission power equal to 25 Indoor units.

Fig. 2-3-3-C



⚠ CAUTION

AG-150A*1 is recommended to connect to TB7 because it performs back-up to a number of data.

In an air conditioner system has more than 1 Outdoor units, AG-150A receiving transmission power through TB3 or TB7 on one of the Outdoor units would have a risk that the connected Outdoor unit failure would stop power supply to AG-150A and disrupt the whole system.

When applying apportioned electric power function, AG-150A is necessary to connected to TB7 and has its own power supply unit PAC-SC51KUA.

Note: Power supply unit PAC-SC51KUA is for AG-150A.

*1: AG-150A is an example model of system controllers.

2. M-NET CONTROL

2-3-4. Power supply to LM adapter LMAP03U

1-phase 208-230V AC power supply is needed.

The power supply unit PAC-SC51KUA is not necessary when connecting only the LMAP03U. Yet, make sure to change the power supply changeover connector CN41 to CN40 on the LM adapter.

2-3-5. Power supply to BM ADAPTER

1-phase 100-240VAC power supply is needed.

The power supply unit PAC-SC51KUA is not necessary when only BM ADAPTER is connected.

Yet, make sure to move the power jumper from CN41 to CN40 on the BM ADAPTER.

2-3-6. Power supply to GB-50ADA-A

1-phase 100-240VAC power supply is needed.

The power supply unit PAC-SC51KUA is not necessary.

GB-50ADA-A supplies power through TB3, which equals 6 indoor units. (refer to Table 2-3-2)

2-4. Address Setting

2-4-1. Switch operation

In order to constitute CITY MULTI in a complete system, switch operation for setting the unit address No. and connection No. is required.

- ① Address No. of outdoor unit, indoor unit and remote controller.
The address No. is set at the address setting board.
In the case of R2 system, it is necessary to set the same No. at the branch No. switch of indoor unit as that of the BC controller connected. (When connecting two or more branches, use the lowest branch No.)
- ② Caution for switch operations
 - Be sure to shut off power source before switch setting. If operated with power source on, switch can not operate properly.
 - No units with identical unit address shall exist in one whole air conditioner system. If set erroneously, the system can not operate.
- ③ MA remote controller
 - When connecting only one remote controller to one group, it is always the main remote controller. When connecting two remote controllers to one group, set one remote controller as the main remote controller and the other as the sub remote controller.
 - The factory setting is "Main".

PAR-21MAA

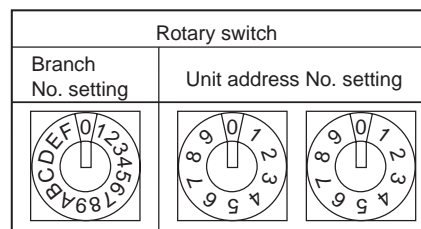
The MA remote controller does not have the switches listed above.
Refer to the installation manual for the function setting.

PAC-YT51CRB

Setting the dip switches
































There are switches on the front of the remote controller. Remote controller Main/Sub and other function settings are performed using these switches. Ordinarily, only change the Main/Sub setting of SW1.
(The factory settings are all "ON".)

SW No	SW contents Main	ON	OFF	Comment
1	Remote controller Main/Sub setting	Main	Sub	Set one of the two remote controllers at one group to "Main"
2	Temperature display units setting	Celsius	Fahrenheit	When the temperature is displayed in [Fahrenheit], set to "No".
3	Cooling/heating display in AUTO mode	Yes	No	When you do not want to display "Cooling" and "Heating" in the Auto mode, set to "No".
4	Intake temperature display	Yes	No	When you do not want to display the intake temperature, set to "No".



2. M-NET CONTROL

2-4-2. Rule of setting address

Unit	Address setting	Example	Note	
Indoor unit	01 ~ 50	 	Use the most recent address within the same group of indoor units. Make the indoor units address connected to the BC controller (Sub) larger than the indoor units address connected to the BC controller (Main). If applicable, set the sub BC controllers in an PURY system in the following order: (1) Indoor unit to be connected to the BC controller (Main) (2) Indoor unit to be connected to the BC controller (No.1 Sub) (3) Indoor unit to be connected to the BC controller (No.2 Sub) Set the address so that (1)<(2)<(3)	
Outdoor unit	51 ~ 99, 100 (Note1)	 	The smallest address of indoor unit in same refrigerant system + 50 Assign sequential address numbers to the outdoor units in one refrigerant circuit system. OC and OS are automatically detected. (Note 2) * Please reset one of them to an address between 51 and 99 when two addresses overlap. * The address automatically becomes "100" if it is set as "01~ 50"	
BC controller (Main)	52 ~ 99, 100	 	The address of outdoor unit + 1 * Please reset one of them to an address between 51 and 99 when two addresses overlap. * The address automatically becomes "100" if it is set as "01~ 50"	
BC controller (Sub)	52 ~ 99, 100	 	Lowest address within the indoor units connected to the BC controller (Sub) plus 50.	
Local remote controller	ME, LOSSNAY Remote controller (Main)	101 ~ 150 1 Fixed	 	The smallest address of indoor unit in the group + 100 * The place of "100" is fixed to "1"
	ME, LOSSNAY Remote controller (Sub)	151 ~ 199, 200 1 Fixed	 	The address of main remote controller + 50 * The address automatically becomes "200" if it is set as "00"
System controller	Group remote controller	201 ~ 250 2 Fixed	 	The smallest group No. to be managed + 200
	System remote controller	000, 201 ~ 250	  	* For TC-24A, the address is set on the screen.
	ON/OFF remote controller	000, 201 ~ 250	  	The smallest group No. to be managed + 200 * The smallest group No. to be managed is changeable.
	AG-150A GB-50ADA GB-24A	000, 201 ~ 250	  	
	PAC-YG50ECA	000, 201 ~ 250	  	* Settings are made on the initial screen of AG-150A.
	BAC-HD150	000, 201 ~ 250	  	* Settings are made with setting tool of BM ADAPTER.
	LMAP03U	201 ~ 250 2 Fixed	 	

Note1: To set the address to "100", set it to "50"

Note2: Outdoor units OC and OS in one refrigerant circuit system are automatically detected.

OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.

2. M-NET CONTROL

2-4-3. System examples

Factory setting

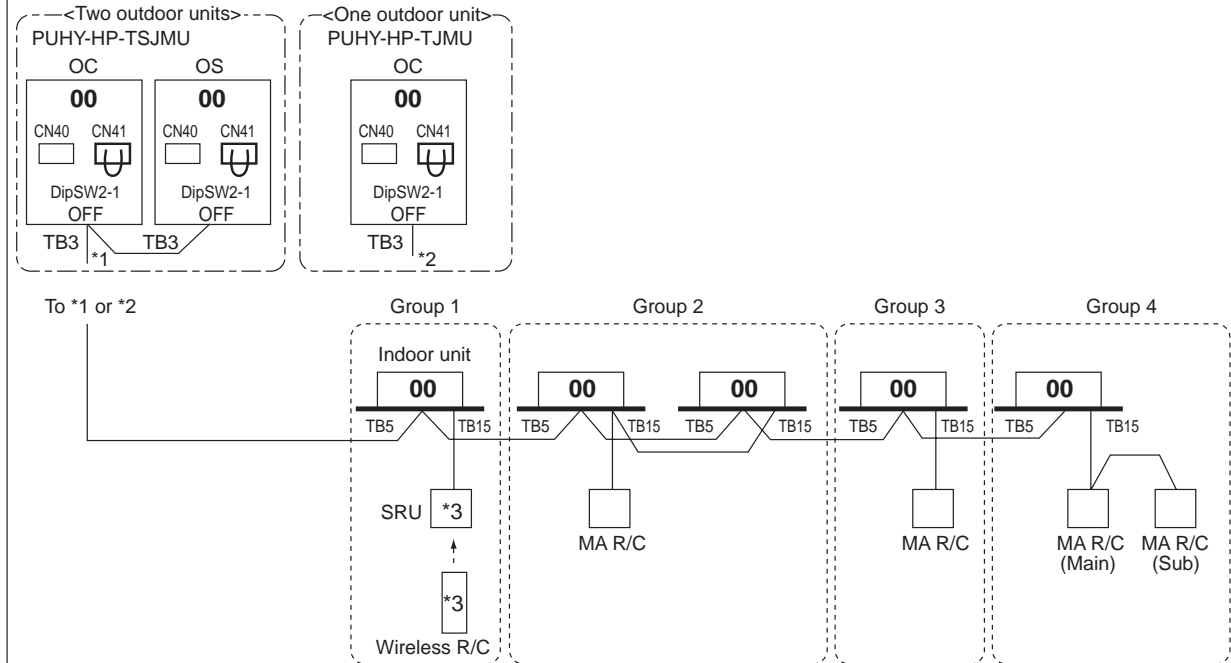
Original switch setting of the outdoors, indoors, controllers and LMAP at shipment is as follows.

- Outdoor unit : Address: 00, CN41: U (Jumper), DipSW2-1: OFF
- Indoor unit : Address: 00
- ME remote controller : Address: 101
- LMAP : Address: 247, CN41: U (Jumper), DipSW1-2: OFF

Setting at the site

- DipSW2-1(Outdoor) : When the System Remote Controller is used, all the Dip SW2-1 at the outdoor units should be set to "ON". * Dip SW2-1 remains OFF when only LMAP03U is used.
- DipSW1-2(LMAP) : When the LMAP is used together with System Remote Controller, DipSW1-2 at the LMAP should be set to "ON".
- CN40/CN41 : Change jumper from CN41 to CN 40 at outdoor control board will activate central transmission power supply to TB7;
(Change jumper at only one outdoor unit when activating the transmission power supply without using a power supply unit.)
Change jumper from CN41 to CN 40 at LMAP will activate transmission power supply to LMAP itself;
Power supply unit is recommended to use for a system having more than 1 outdoor unit, because the central transmission power supply from TB7 of one of outdoor units is risking that the outdoor unit failure may let down the whole system controller system.

2-4-3-1. MA remote controller, Single-refrigerant-system, No System Controller



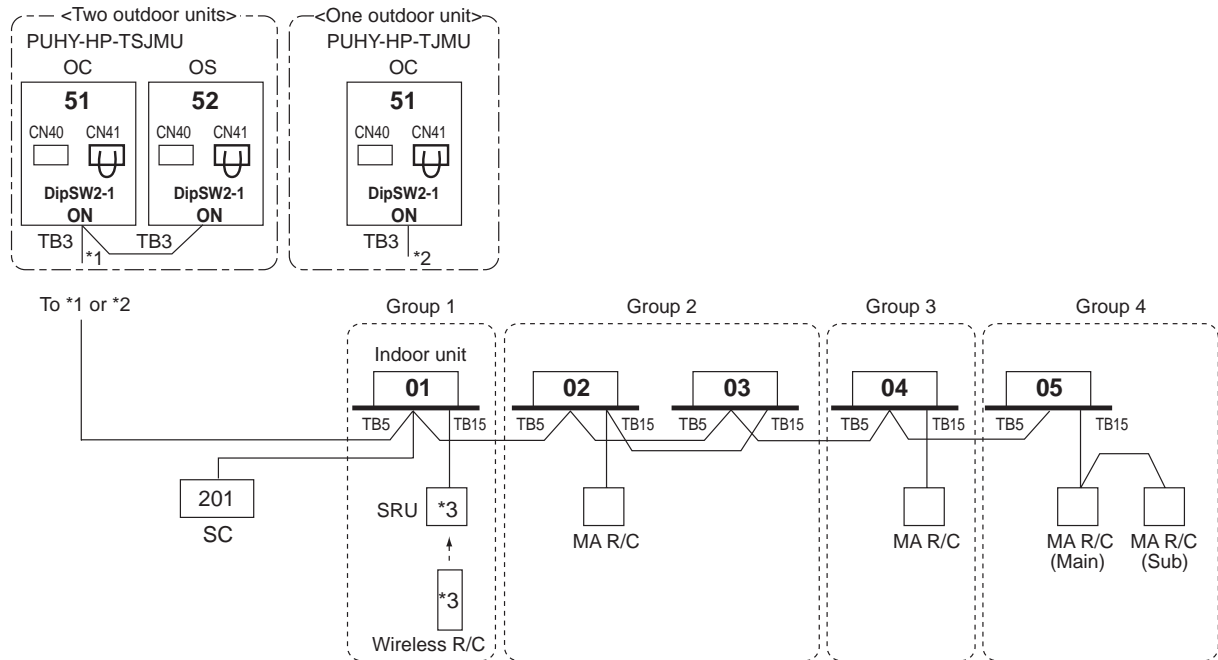
*3 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

NOTE:

1. Outdoor units OC and OS in one refrigerant circuit system are automatically detected.
OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. No address setting is needed.
3. For a system having more than 16 indoor unit, confirm the need of Booster at 2-3 "System configuration restrictions".

2. M-NET CONTROL

2-4-3-2. MA remote controller, Single-refrigerant-system, System Controller



*3 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*SC can be connected to TB3 side or TB7 side;

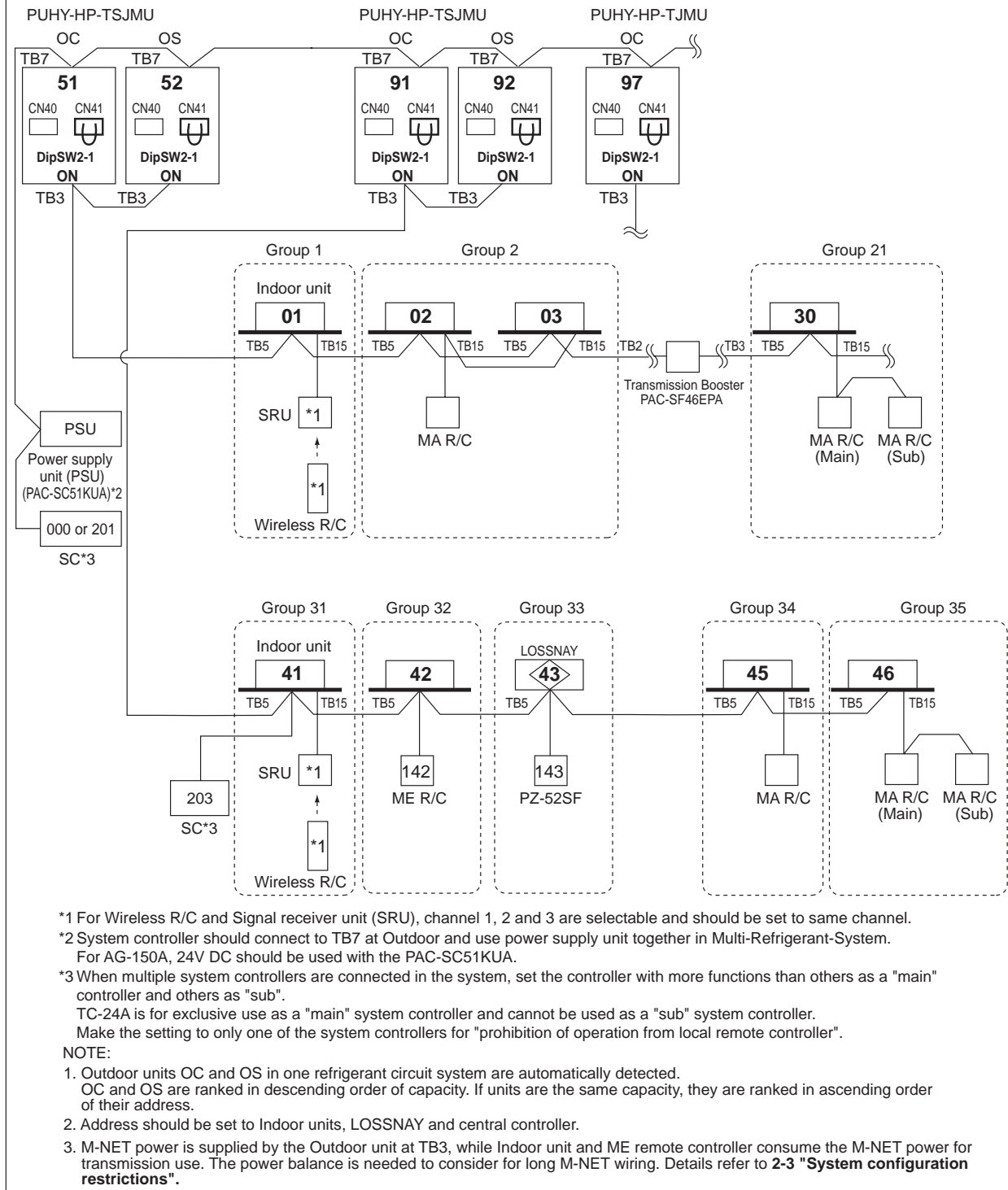
Should SC connected to TB7 side, change Jumper from CN41 to CN40 at the Outdoor unit module so as to supply power to the SC.

NOTE:

1. Outdoor units OC and OS in one refrigerant circuit system are automatically detected.
OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units and central controller.
3. For a system having more than 16 indoor unit, confirm the need of Booster at 2-3 "System configuration restrictions".

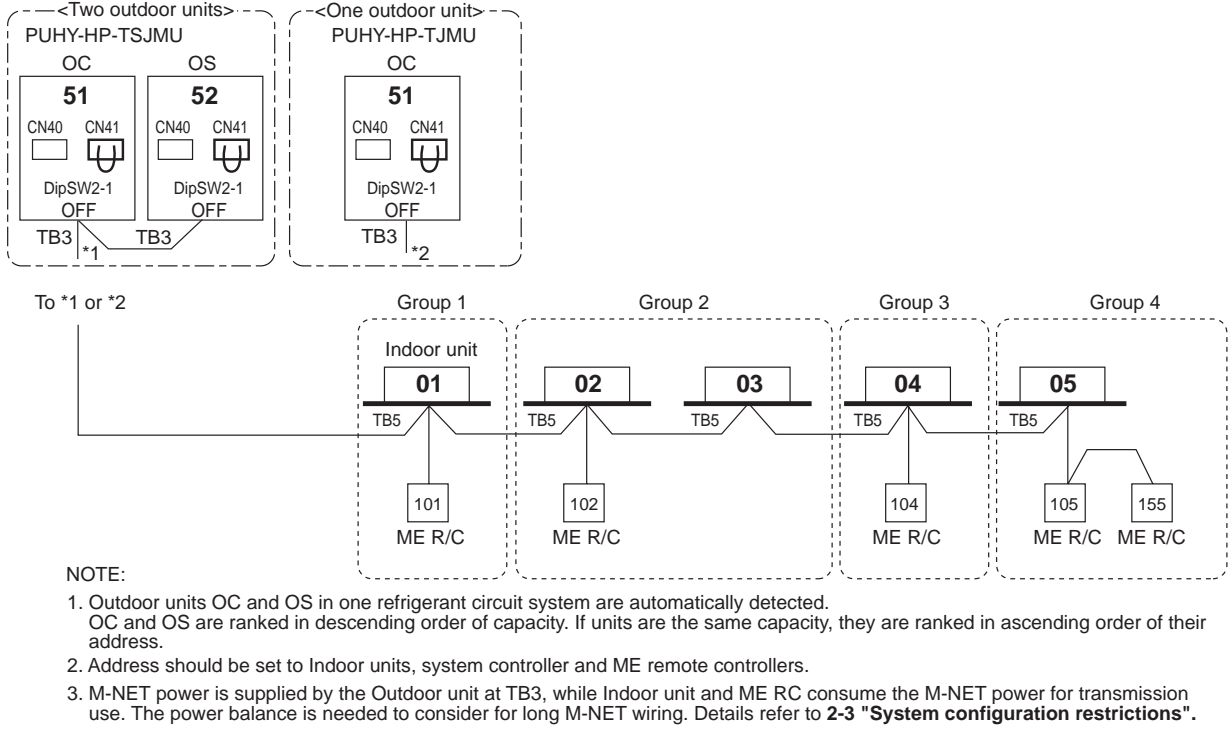
2. M-NET CONTROL

2-4-3-3. MA remote controller, Multi-refrigerant-system, System Controller at TB7 side, Booster for long M-NET wiring

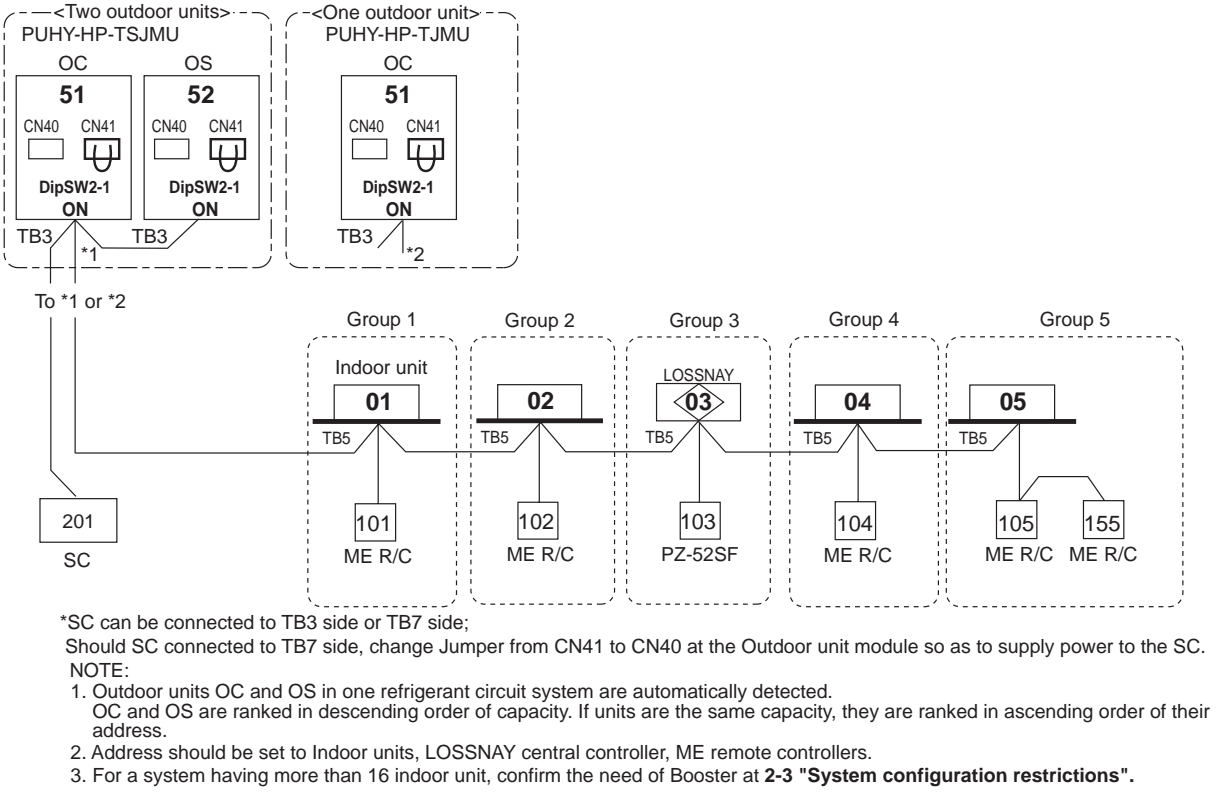


2. M-NET CONTROL

2-4-3-4. ME remote controller, Single-refrigerant-system, No system controller

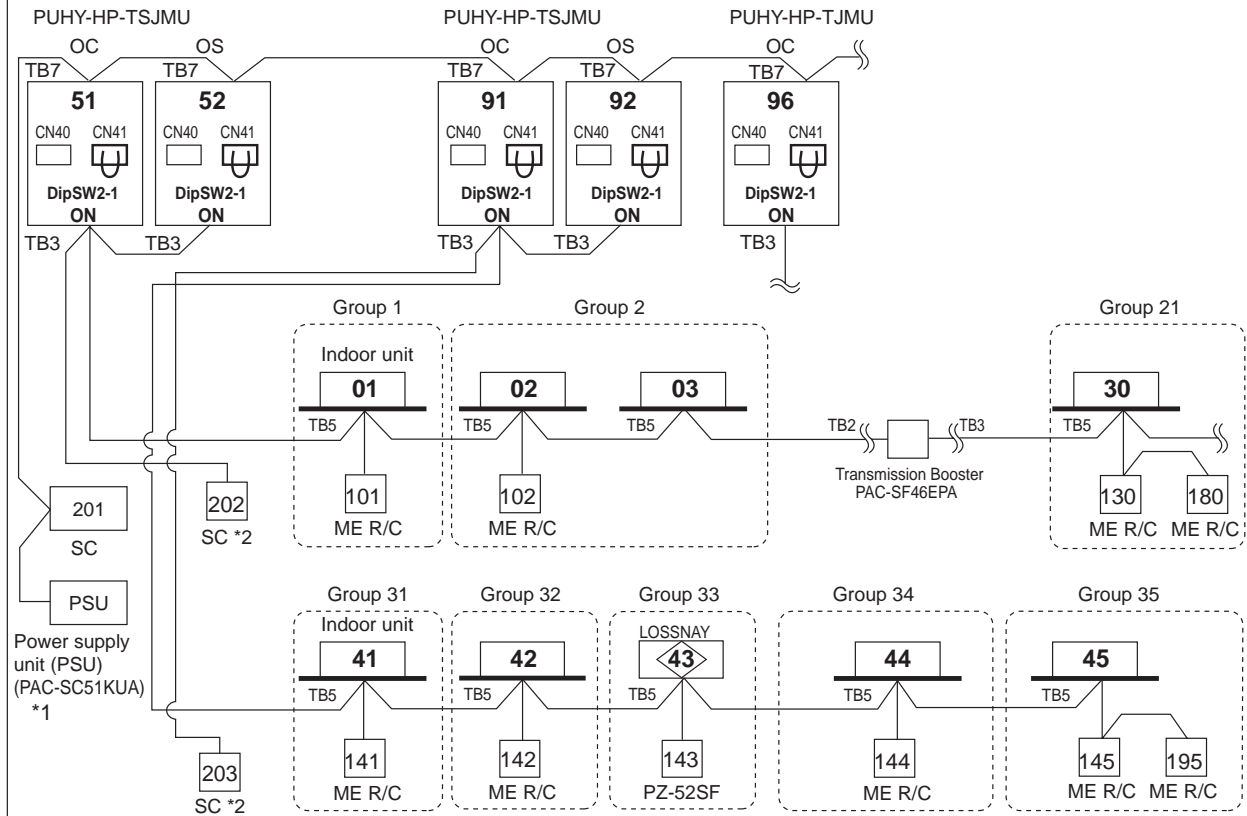


2-4-3-5. ME remote controller, Single-refrigerant-system, System controller, LOSSNAY



2. M-NET CONTROL

2-4-3-6. ME remote controller, Multi-refrigerant-system, System Controller at TB 7side, LOSSNAY, Booster for M-NET wiring



*1 System controller should connect to TB7 at Outdoor and use power supply unit together in Multi-Refrigerant-System.

For AG-150A, 24V DC should be used with the PAC-SC51KUA.

*2 When multiple system controllers are connected in the system, set the controller with more functions than others as a "main" controller and others as "sub".

TC-24A, AG-150A, GB-50ADA and GB-24A are for exclusive use as a "main" system controller and cannot be used as a "sub" system controller.

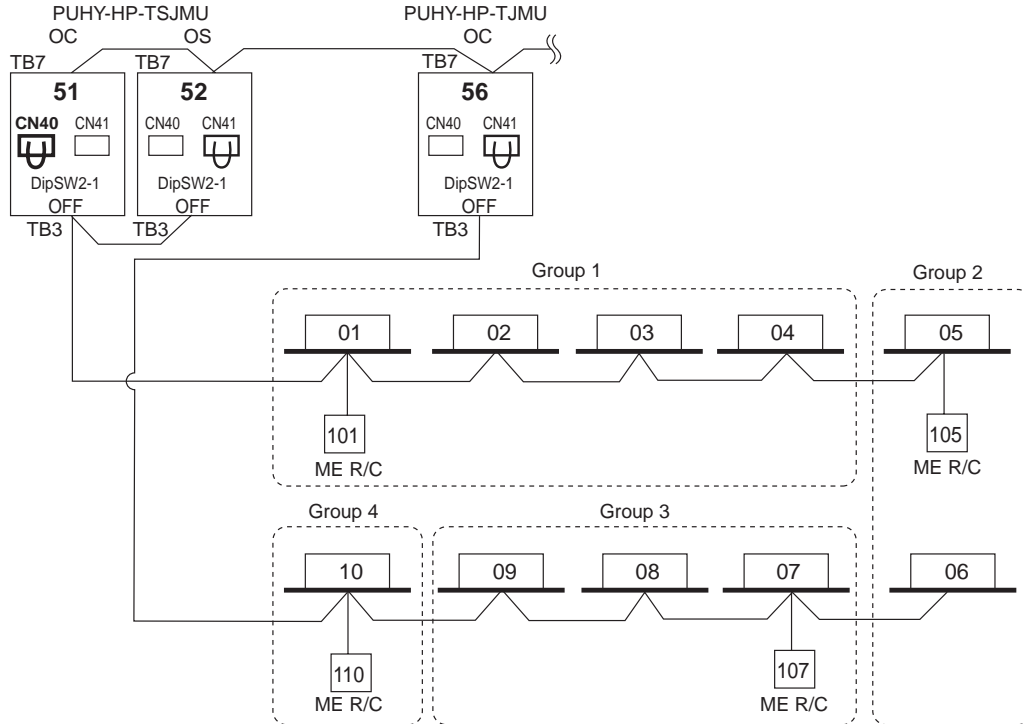
Make the setting to only one of the system controllers for "prohibition of operation from local remote controller".

NOTE:

- Outdoor units OC and OS in one refrigerant circuit system are automatically detected.
OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
- M-NET power is supplied by the Outdoor unit at TB3, while Indoor unit and ME remote controller consume the M-NET power for transmission use. The power balance is needed to consider for M-NET wiring. Details refer to "**System configuration restrictions**".

2. M-NET CONTROL

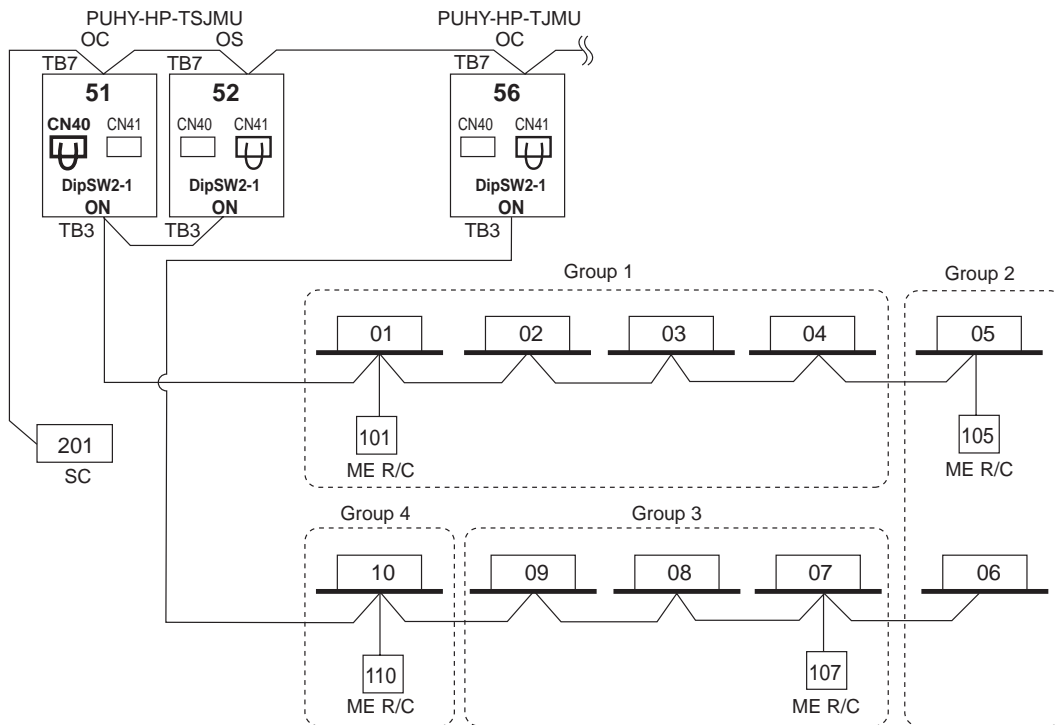
2-4-3-7. ME remote controller, Multi-refrigerant-system, No Power supply unit



NOTE

- It is necessary to change the connector to CN40 on the outdoor unit control board (only one outdoor unit) when the group is set between other refrigerant systems.
- It is necessary to set on the remote controller by manual when group sets on the different refrigerant system. Please refer to remote controller installation manual.

2-4-3-8. ME remote controller, Multi-refrigerant-system, System Controller at TB7 side, No Power supply unit



NOTE

- It is necessary to change the connector to CN40 on the outdoor unit control board (only one outdoor unit) when the group is set between other refrigerant systems.
- It is necessary to set on the remote controller by manual when group sets on the different refrigerant system. Please refer to remote controller installation manual.

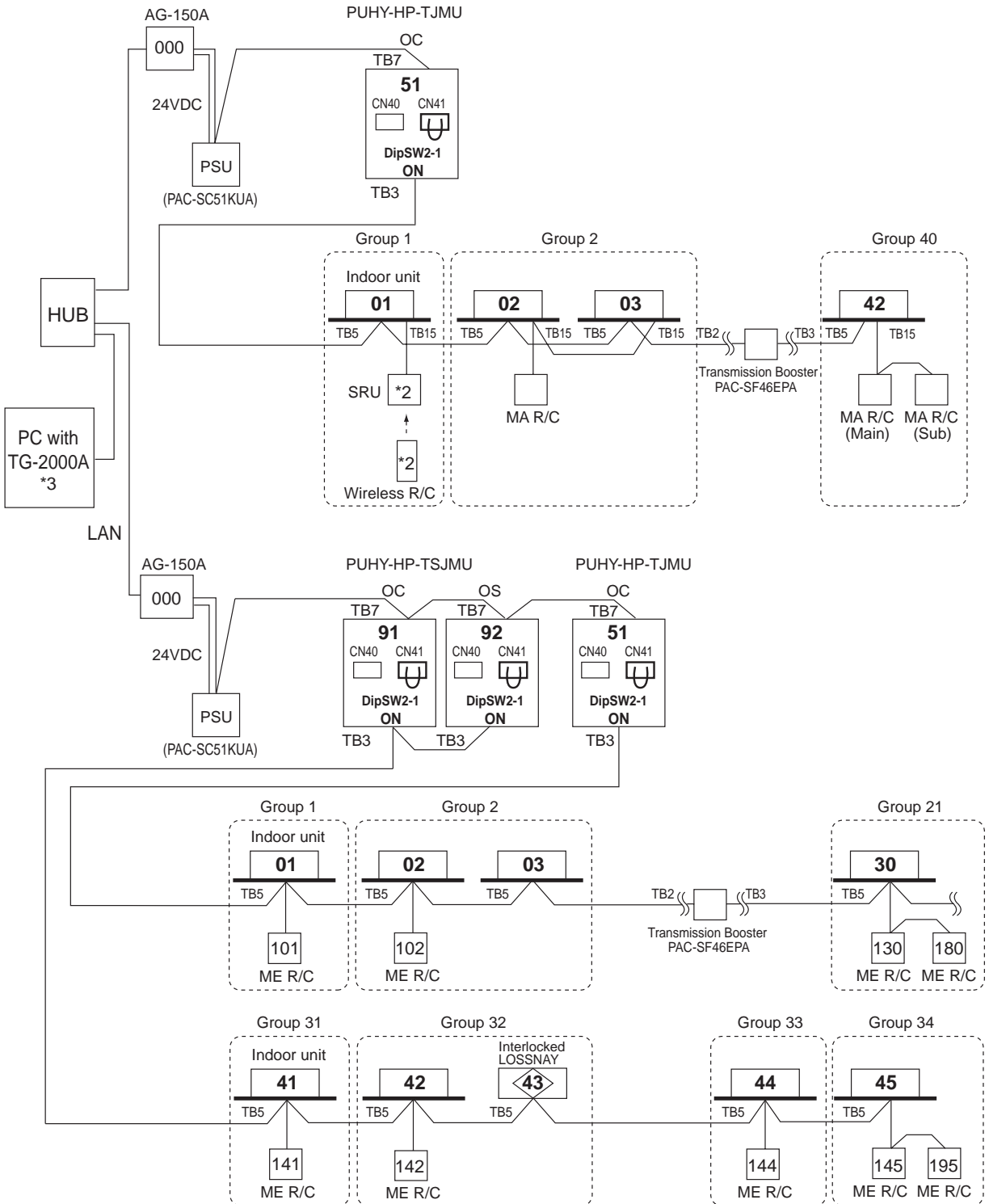
2. M-NET CONTROL

2-4-3-9. TG-2000A + AG-150A/GB-50A

AG-150A/GB-50A can control max. 50 indoor units.

TG-2000A can control max. 40 pieces of AG-150A*2 or GB-50A;

TG-2000A can control max. 2000 indoor units.



NOTE

• It is planned that GB-50ADA will be supported on TG-2000A Ver. 6.3* or later.

*1 When AG-150A is connected with expansion controllers (PAC-YG50ECA), AG-150A here means PAC-YG50ECA.

*2 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

3 AG-150A connected with PAC-YG50ECA is compatible with TG-2000A Ver.6.10 or later.

2. M-NET CONTROL

2-4-3-10. LMAP

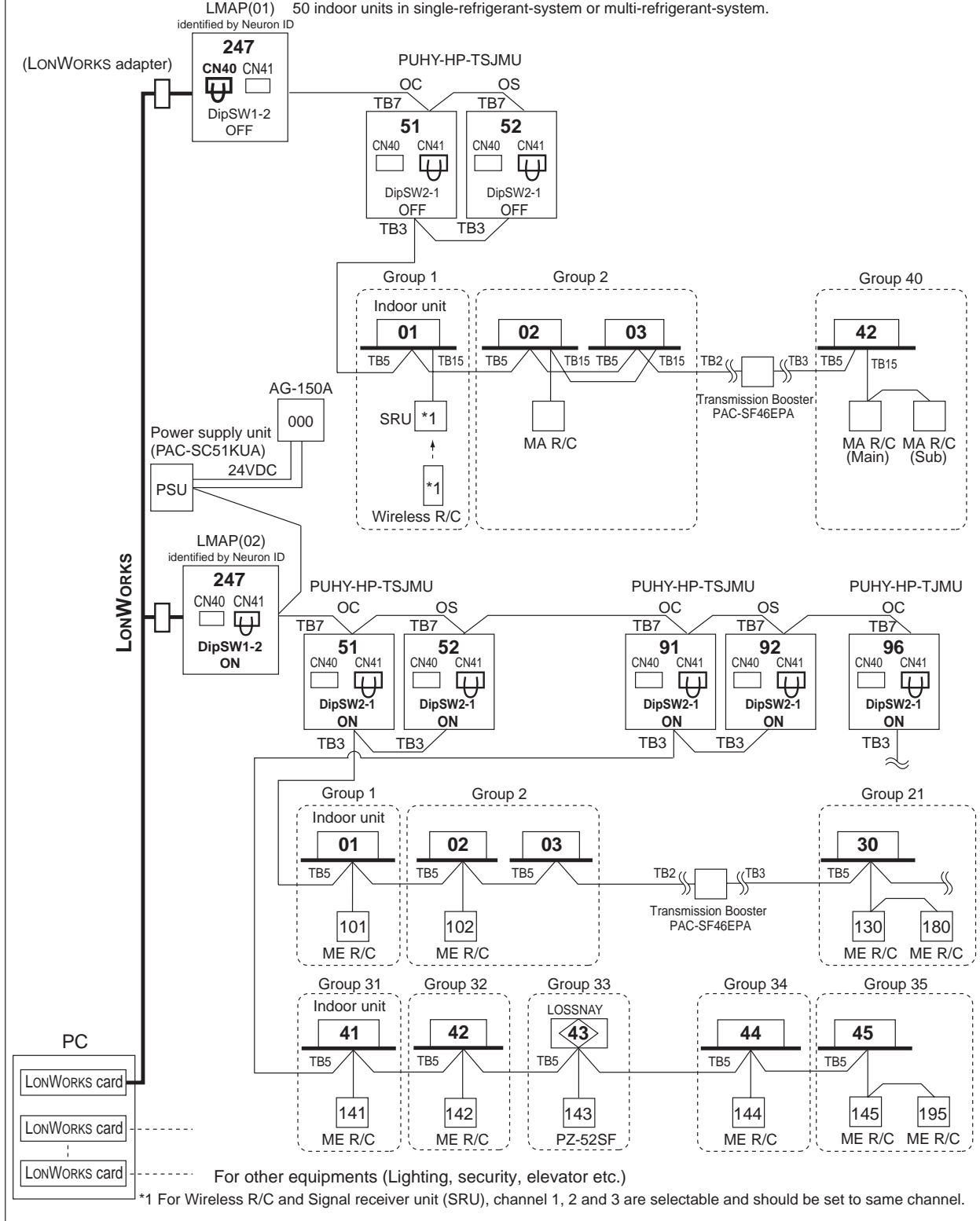
LMAP can transmit max. 50 indoor units;

If system controller (SC) is used, DipSW1-2 at LMAP and DipSW2-1 at Outdoor unit should set to "ON".

Change Jumper from CN41 to CN40 to activate power supply to LMAP itself for those LMAP connected without system controller (SC).

LMAP can transmit for max.

50 indoor units in single-refrigerant-system or multi-refrigerant-system.

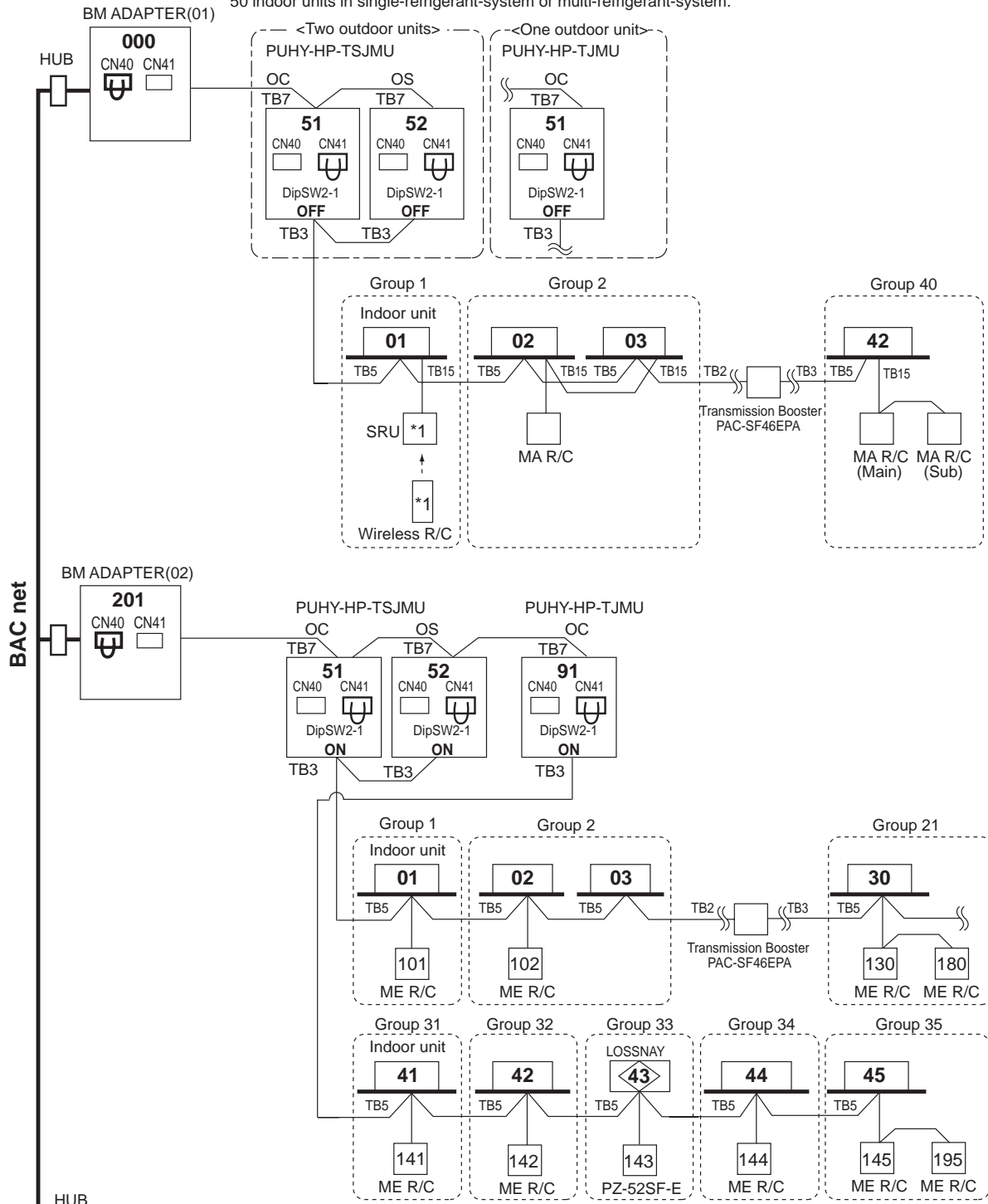


2. M-NET CONTROL

2-4-3-11. BM ADAPTER

BM ADAPTER can transmit max. 50 indoor units;
Change Jumper from CN41 to CN40 to activate power supply to BM ADAPTER itself for those BM ADAPTER connected without the power supply unit.

BM ADAPTER can transmit for max. 50 indoor units in single-refrigerant-system or multi-refrigerant-system.



For other equipments (Lighting, security, elevator etc.)

*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

3. PIPING DESIGN

3-1. R410A Piping Material

Refrigerant pipe for CITY MULTI shall be made of phosphorus deoxidized copper, and has two types.

A. Type-O : Soft copper pipe (annealed copper pipe), can be easily bent with human's hand.

B. Type-1/2H pipe : Hard copper pipe (Straight pipe), being stronger than Type-O pipe of the same radial thickness.

The maximum operation pressure of R410A air conditioner is 4.30 MPa [623psi]. The refrigerant piping should ensure the safety under the maximum operation pressure. MITSUBISHI ELECTRIC recommends pipe size as Table 3-1, or You shall follow the local industrial standard. Pipes of radical thickness 0.7mm or less shall not be used.

Table 3-1. Copper pipe size and radial thickness for R410A CITY MULTI.

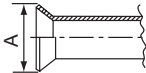
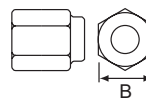
Size (mm)	Size (inch)	Radial thickness (mm)	Radial thickness (mil)	Pipe type
ø6.35	ø1/4"	0.8	[32]	Type-O
ø9.52	ø3/8"	0.8	[32]	Type-O
ø12.7	ø1/2"	0.8	[32]	Type-O
ø15.88	ø5/8"	1.0	[40]	Type-O
ø19.05	ø3/4"	1.2	[48]	Type-O
ø19.05	ø3/4"	1.0	[40]	Type-1/2H or H
ø22.2	ø7/8"	1.0	[40]	Type-1/2H or H
ø25.4	ø1"	1.0	[40]	Type-1/2H or H
ø28.58	ø1-1/8"	1.0	[40]	Type-1/2H or H
ø31.75	ø1-1/4"	1.1	[44]	Type-1/2H or H
ø34.93	ø1-3/8"	1.2	[48]	Type-1/2H or H
ø41.28	ø1-5/8"	1.4	[56]	Type-1/2H or H

* For pipe sized ø19.05 (3/4") for R410A air conditioner, choice of pipe type is up to you.

* The figures in the radial thickness column are based on the Japanese standards and provided only as a reference. Use pipes that meet the local standards.

Flare

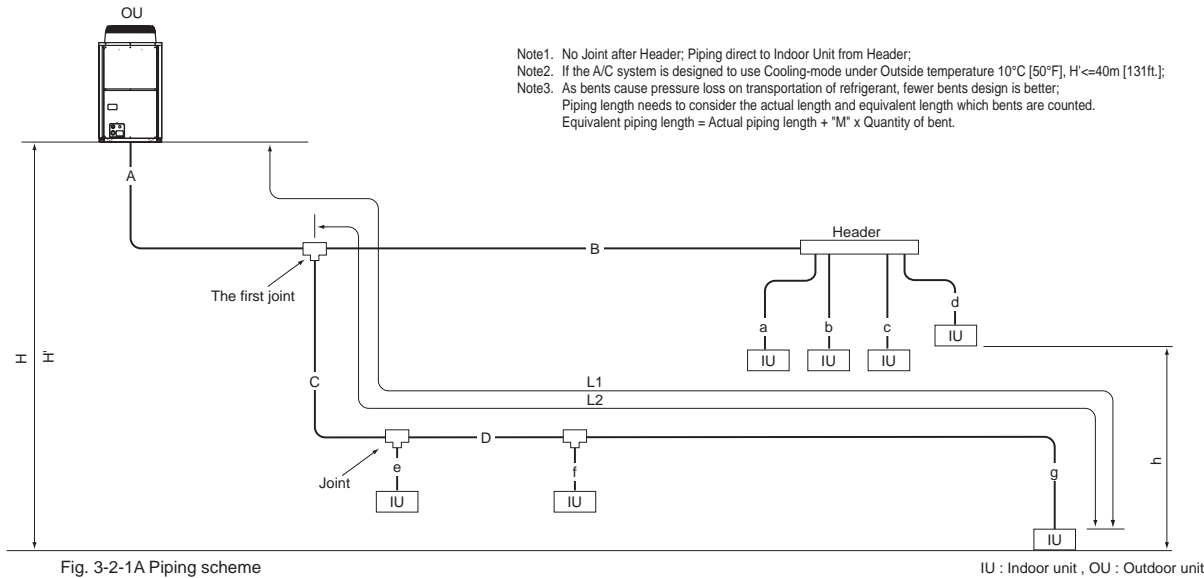
Due to the relative higher operation pressure of R410A compared to R22, the flare connection should follow dimensions mentioned below so as to achieve enough the air-tightness.

Flare pipe	Pipe size	A (For R410A) (mm[in.])	Flare nut	Pipe size	B (For R410A) (mm[in.])
	ø6.35 [1/4"]	9.1 [3/8"]		ø6.35 [1/4"]	17.0 [3/4"]
	ø9.52 [3/8"]	13.2 [9/16"]		ø9.52 [3/8"]	22.0 [7/8"]
	ø12.70 [1/2"]	16.6 [11/16"]		ø12.70 [1/2"]	26.0 [1-1/16"]
	ø15.88 [5/8"]	19.7 [13/16"]		ø15.88 [5/8"]	29.0 [1-1/8"]
	ø19.05 [3/4"]	24.0 [1"]		ø19.05 [3/4"]	36.0 [1-7/16"]

3. PIPING DESIGN

3-2. Piping Design

3-2-1. PUHY-HP-72, 96TJMU Piping



Note1. No Joint after Header; Piping direct to Indoor Unit from Header;
 Note2. If the A/C system is designed to use Cooling-mode under Outside temperature 10°C [50°F], H' <= 40m [131ft.];
 Note3. As bents cause pressure loss on transportation of refrigerant, fewer bents design is better;
 Piping length needs to consider the actual length and equivalent length which bents are counted.
 Equivalent piping length = Actual piping length + "M" x Quantity of bent.

Fig. 3-2-1A Piping scheme

Item	Piping in the figure	Max. length	Max. equivalent length
Total piping length	A+B+C+D+a+b+c+d+e+f+g	300 [984']	-
Farthest IU from OU (L1)	A+C+D+g / A+B+d	150 [492']	175 [574']
Farthest IU from first Joint (L2)	C+D+g / B+d	40 [131']	40 [131']
Height between OU and IU (OU above IU)	H	50 [164']	-
Height between OU and IU (OU under IU)	H'	40 [131']	-
Height between IU and IU	h	15 [49']	-

Outdoor Model	M (m/bends [ft./bends])
PUHY-HP72TJMU	0.30 [0.99]
PUHY-HP96TJMU	0.35 [1.15]

OU: Outdoor Unit, IU: Indoor Unit

Outdoor and the first Joint	Pipe(Liquid)	Pipe(Gas)
PUHY-HP72TJMU=CMY-Y102S-G2	ø12.70 [1/2"]	ø19.05 [3/4"]
PUHY-HP96TJMU=CMY-Y102L-G2	ø12.70 [1/2"]	ø22.20 [7/8"]

Total down-stream Indoor capacity	Joint
~ P72	CMY-Y102S-G2
P73 ~ P144	CMY-Y102L-G2
P145 ~ P234	CMY-Y202-G2
P235 ~	CMY-Y302-G2

*Concerning detailed usage of Joint parts, refer to its Installation Manual.

Total down-stream Indoor capacity	Pipe(Liquid)	Pipe(Gas)
~ P54	ø9.52 [3/8"]	ø15.88 [5/8"]
P55 ~ P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P73 ~ P108	ø9.52 [3/8"]	ø22.20 [7/8"]
P109 ~ P144	ø12.70 [1/2"]	ø28.58 [1-1/8"]
P145 ~ P234	ø15.88 [5/8"]	ø28.58 [1-1/8"]

Total down-stream Indoor capacity	4-branch Header	8-branch Header	10-branch Header
	CMY-Y104-G	CMY-Y108-G	CMY-Y1010-G
	<=P72	<=P144	<=P234

* CMY-Y104-G can directly connect PUHY-HP72TJMU, but can NOT directly connect PUHY-HP96TJMU or above;
 * CMY-Y108-G can directly connect PUHY-HP72-144T(S)JMU, but can NOT directly connect PUHY-HP192T(S)JMU
 * CMY-Y1010-G can directly connect PUHY-HP72-192T(S)JMU;
 * CMY-Y104-G can NOT connect P72, P96 Indoor, but CMY-Y108, Y1010-G can do;
 * Concerning detailed usage of Header parts, refer to its Installation Manual.

Indoor Unit size	Pipe(Liquid)	Pipe(Gas)
P06,P08,P12,P15,P18	ø6.35 [1/4"]	ø12.70 [1/2"]
P24,P27,P30,P36,P48,P54	ø9.52 [3/8"]	ø15.88 [5/8"]
P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P96	ø9.52 [3/8"]	ø22.20 [7/8"]

Note4. Indoor capacity is described as its model size;
 For example, PEFY-P08NMAU-E, its capacity is P06;
 Note5. Total down-stream Indoor capacity is the summary of the model size of Indoors downstream.
 For example, PEFY-P06NMAU-E+PEFY-P08NMAU-E: Total Indoor capacity=P06+P08=P14
 Note6. Piping sized determined by the Total down-stream indoor capacity is NOT necessary to be bigger than the up-stream one.
 i.e. A>=B; A>=C>=D

3. PIPING DESIGN

3-2-2. PUHY-HP144-192TSJMU Piping

2010 H2i[®]
Y-SERIES
SYSTEM DESIGN

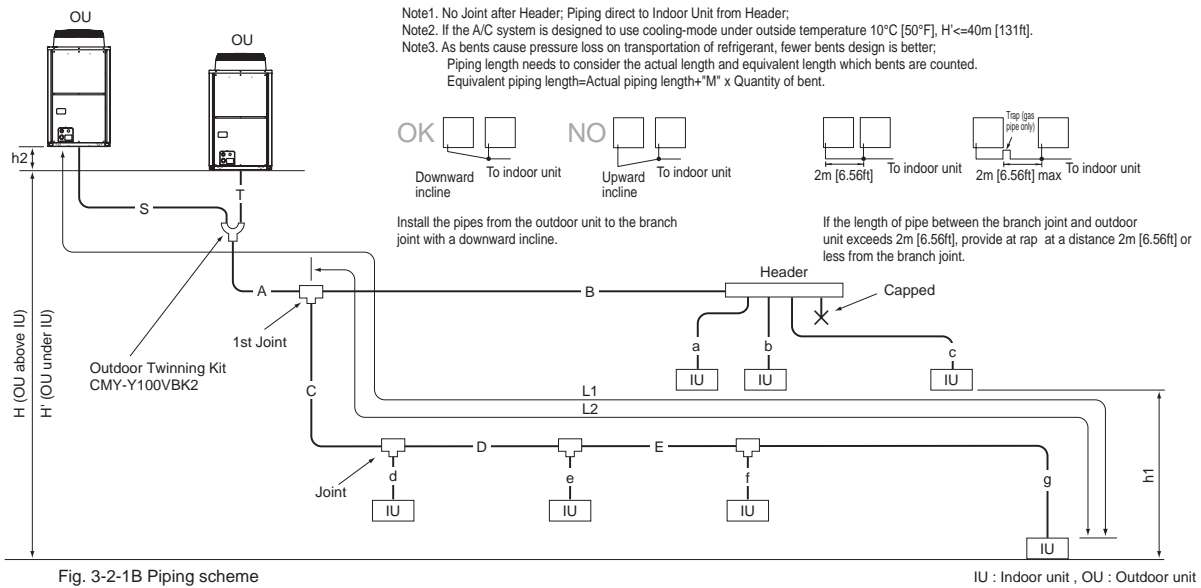


Table3-2-2-1. Piping length

Item	Piping in the figure	Max. length	Max. equivalent length
Total piping length	S+T+A+B+C+D+E+a+b+c+d+e+f+g	300 [984']	-
Distance between OU and OU	S+T	10[32']	-
Height between OU and OU	h2	0.1[0.3']	-
Farthest IU from OU (L1)	S(T)+A+C+D+E+g / S(T)+A+B+c	150 [492']	175 [574']
Farthest IU from the first Joint (L2)	C+D+E+g / B+c	40 [131']	40 [131']
Height between OU and IU (OU above IU)	H	50 [164']	-
Height between OU and IU (OU under IU)	H'	40 [131']	-
Height between IU and IU	h1	15 [49']	-

OU: Outdoor Unit, IU: Indoor Unit

Table3-2-2-2. Bent equivalent length "M"

Outdoor Model	M (m/bends [ft./bends])
PUHY-HP144TSJMU	0.50 [1.64]
PUHY-HP192TSJMU	0.50 [1.64]

Table3-2-2-3. Piping "A" size selection rule

Outdoor and the first Joint	Pipe(Liquid)	Pipe(Gas)
CMY-Y100VBK2=CMY-Y202-G2	ø15.88[5/8"]	ø28.58[1-1/8"]

For Piping size "S", "T", please refer to specification of the Twinning kit CMY-Y100VBK2 at the Outdoor unit's external drawing.

Table3-2-2-4. R410A Joint selection rule

Total down-stream Indoor capacity	Joint
~ P72	CMY-Y102S-G2
P73 ~ P144	CMY-Y102L-G2
P145 ~ P234	CMY-Y202-G2

*First Joint is always CMY-Y202-G2;

*Concerning detailed usage of Joint parts, refer to its Installation Manual.

3-3. Refrigerant Charge Calculation

At the time of shipping, the outdoor unit is charged with the refrigerant. As this charge does not include the amount needed for extended piping, additional charging for each refrigerant line will be required on site. In order that future servicing may be properly provided, always keep a record of the size and length of each refrigerant line and the amount of additional charge by writing it in the space provided on the outdoor unit.

(1) Calculation of additional refrigerant charge

- Calculate the amount of additional charge based on the length of the piping extension and the size of the refrigerant line.
- Use the table to the below as a guide to calculating the amount of additional charging and charge the system accordingly.
- If the calculation results in a fraction of less than 0.1kg, round up to the next 0.1kg. For example, if the result of the calculation was 12.38kg, round the result up to 12.4kg.
- If the calculation results in a fraction of less than 1oz, round up to the next 1oz. For example, if the result of the calculation was 435.1oz, round the result up to 436oz.


<Additional Charge>

Additional refrigerant charge	=	Total length of liquid pipe sized $\phi 19.05$ [3/4"]	+	Total length of liquid pipe sized $\phi 15.88$ [5/8"]	+	Total length of liquid pipe sized $\phi 12.7$ [1/2"]	+	Total length of liquid pipe sized $\phi 9.52$ [3/8"]	+	Total length of liquid pipe sized $\phi 6.35$ [1/4"]	+ α
(kg) (oz)		(m) x 0.29 (kg/m) (ft.) x 3.1 [oz/ft.]		(m) x 0.20 (kg/m) (ft.) x 2.15 [oz/ft.]		(m) x 0.12 (kg/m) (ft.) x 1.29 [oz/ft.]		(m) x 0.06 (kg/m) (ft.) x 0.65 [oz/ft.]		(m) x 0.024 (kg/m) (ft.) x 0.26 [oz/ft.]	

Table3-2-3-1. Value of α

Total capacity of connecting indoor units	α
Models ~ 27	2.0 kg [71 oz]
Models 28 ~ 54	2.5 kg [89 oz]
Models 55 ~ 126	3.0 kg [106 oz]
Models 127 ~ 144	3.5 kg [124 oz]
Models 145 ~ 180	4.5 kg [159 oz]
Models 181 ~ 234	5.0 kg [177 oz]
Models 235 ~	6.0 kg [212 oz]

Example: PUHY-HP96TJMU



m [kg]					ft. [oz]				
Indoor 1: P48	A: $\phi 12.7$	40 m	a: $\phi 9.52$	10 m	Indoor 1: P48	A: $\phi 1/2"$	131ft.	a: $\phi 3/8"$	32ft.
2: P36	B: $\phi 9.52$	10 m	b: $\phi 9.52$	5 m	2: P36	B: $\phi 3/8"$	32ft.	b: $\phi 3/8"$	16ft.
3: P15	C: $\phi 9.52$	15 m	c: $\phi 6.35$	10 m	3: P15	C: $\phi 3/8"$	49ft.	c: $\phi 1/4"$	32ft.
4: P12	D: $\phi 9.52$	10 m	d: $\phi 6.35$	10 m	4: P12	D: $\phi 3/8"$	32ft.	d: $\phi 1/4"$	32ft.
5: P24			e: $\phi 9.52$	10 m	5: P24			e: $\phi 3/8"$	32ft.

The total length of liquid pipe of each size is as follows:
 $\phi 12.7$: A = 40 = 40 m
 $\phi 9.52$: B + C + D + a + b + e = 10 + 15 + 10 + 10 + 5 + 10 = 60 m
 $\phi 6.35$: c + d = 10 + 10 = 20 m

Total capacity of connecting Indoor units Pt :
 Pt = P48 + P36 + P15 + P12 + P24 = P135, therefore $\alpha = 3.5$ kg

The total length of liquid pipe of each line is as follows:
 $\phi 1/2"$: A = 131 = 131ft.
 $\phi 3/8"$: B + C + D + a + b + e = 32 + 49 + 32 + 32 + 16 + 32 = 193ft.
 $\phi 1/4"$: c + d = 32 + 32 = 64ft.

Total capacity of connecting Indoor units Pt :
 Pt = P48 + P36 + P15 + P12 + P24 = P135, therefore $\alpha = 124$ oz

Additional refrigerant charge	=	Total length of liquid pipe sized $\phi 19.05$	+	Total length of liquid pipe sized $\phi 15.88$	+	Total length of liquid pipe sized $\phi 12.7$	+	Total length of liquid pipe sized $\phi 9.52$	+	Total length of liquid pipe sized $\phi 6.35$	+ 3.5
(kg)		x 0.29 (kg/m)		x 0.20 (kg/m)		x 0.12 (kg/m)		x 0.06 (kg/m)		x 0.024 (kg/m)	
		0 (m) x 0.29 (kg/m)		0 (m) x 0.20 (kg/m)		40 (m) x 0.12 (kg/m)		60 (m) x 0.06 (kg/m)		20 (m) x 0.024 (kg/m)	
		= 0		+ 0		+ 40 x 0.12		+ 60 x 0.06		+ 20 x 0.024	+ 3.5
		= 12.4 kg									

or
ft. [oz]

Additional refrigerant charge	=	Total length of liquid pipe sized $\phi 3/4"$	+	Total length of liquid pipe sized $\phi 5/8"$	+	Total length of liquid pipe sized $\phi 1/2"$	+	Total length of liquid pipe sized $\phi 3/8"$	+	Total length of liquid pipe sized $\phi 1/4"$	+ 124
(oz)		x 3.1 (oz/ft.)		x 2.15 (oz/ft.)		x 1.29 (oz/ft.)		x 0.65 (oz/ft.)		x 0.26 (oz/ft.)	
		0 (ft.) x 3.1 (oz/ft.)		0 (ft.) x 2.15 (oz/ft.)		131 (ft.) x 1.29 (oz/ft.)		193 (ft.) x 0.65 (oz/ft.)		64 (ft.) x 0.26 (oz/ft.)	
		= 0		+ 0		+ 131 x 1.29		+ 193 x 0.65		+ 64 x 0.26	+ 124
		= 436 [oz]									

4. OUTDOOR INSTALLATION

4-1. Installation Site Requirements

1. Do not install in an area where the unit could be subjected to direct heat.
2. Avoid installing the unit in a location where the operating sound could be an annoyance.
3. Avoid the sites where strong winds blow.
4. Install on a stable, load-bearing surface.
5. Ensure there is adequate drain flow from the unit when in heating mode
6. See space requirements for installation and maintenance.
7. Do not install the unit in an environment that may have combustible gas, oil, steam, chemical gas like acidic solutions, sulfur gas, etc.
8. To ensure an adequate flow velocity for the exhaust pipe, make sure its horizontal gradient is higher than 1/100.

4. OUTDOOR INSTALLATION

4-2. Installation Clearance Space

In case of single installation

- Secure enough space around the unit as shown in the figure.

<A> : Top view

(A) : Front

(C) : Back

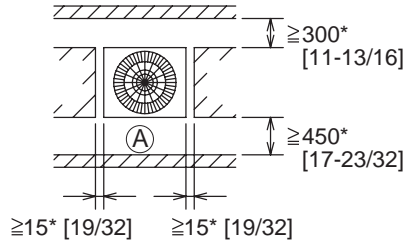
 : Side view

(B) : Unit height

(D) : Air outlet guide (Procured at the site)

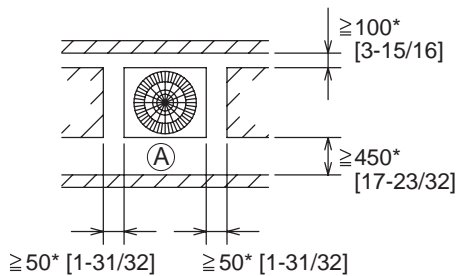
<C> : When there is little space up to an obstruction

- (1) If the distance is 300 mm [11-13/16 in.] or more between the rear side and the wall



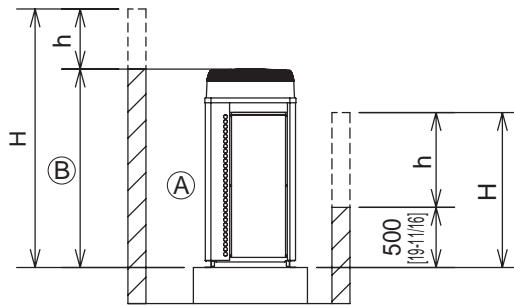
<A>

- (2) If the distance is 100 mm [3-15/16 in.] or more between the rear side and the wall



<A>

- (3) If the wall height (H) of the front, rear or side exceeds the wall height restriction



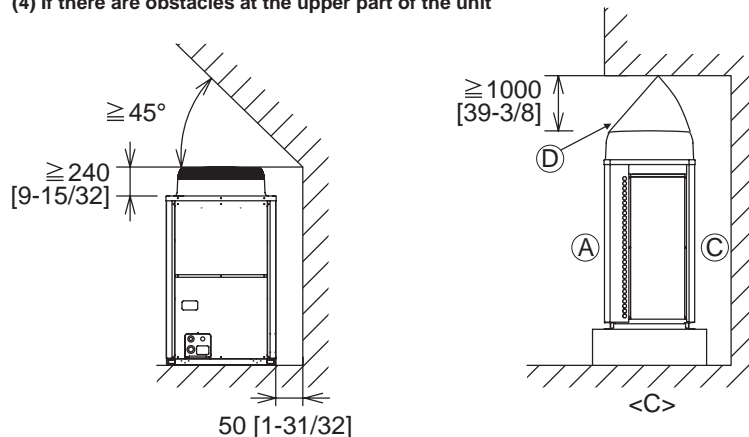
- When the height of the walls on the front, back or on the sides <H> exceeds the wall height limit as defined below, add the height that exceeds the height limit <h> to the figures that are marked with an asterisk.

<Wall height limit> Front: Up to the unit height

Back: Up to 500mm [19-11/16 in.] from the unit bottom

Side: Up to the unit height

- (4) If there are obstacles at the upper part of the unit



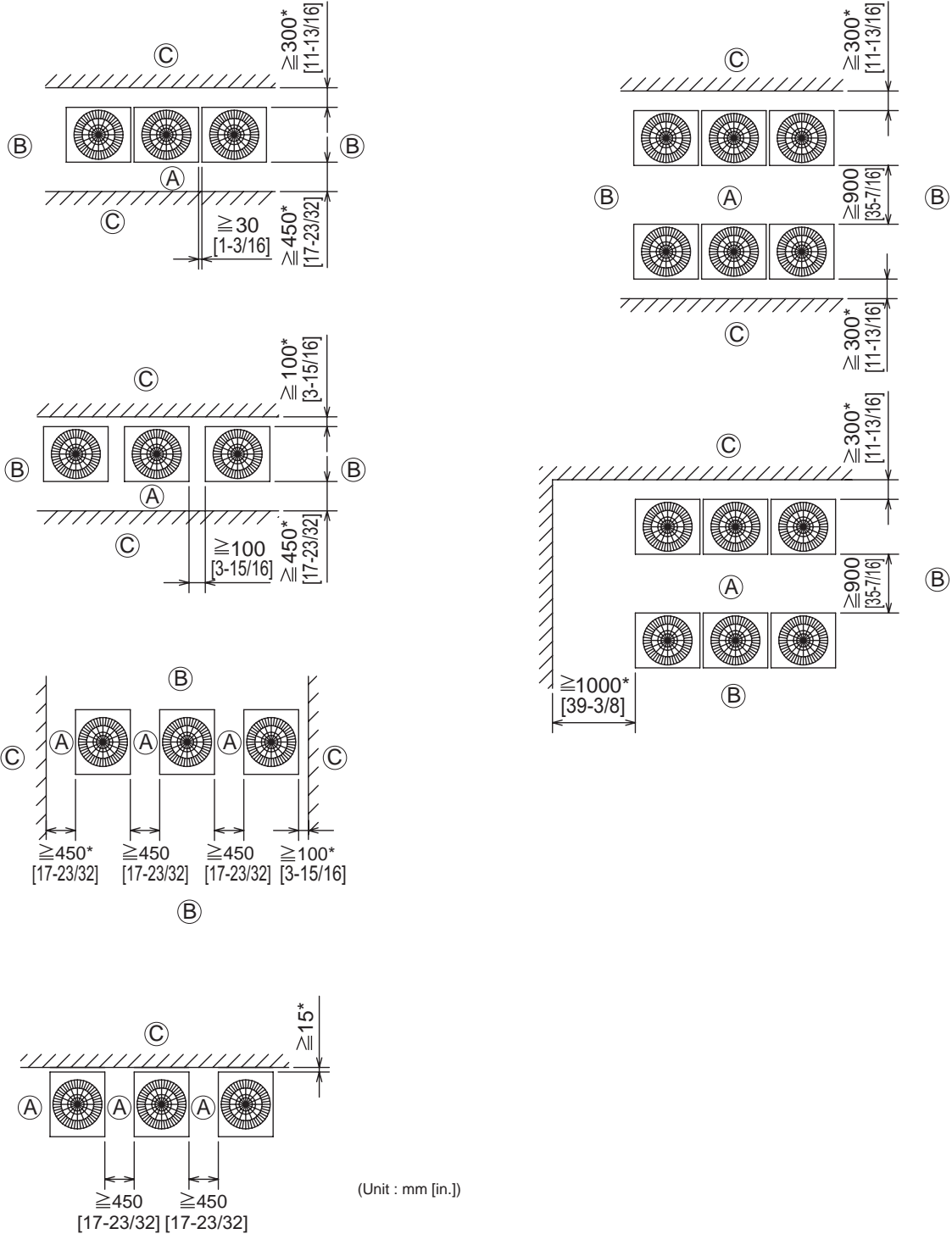
(Unit : mm [in.])

4. OUTDOOR INSTALLATION

In case of collective installation and continuous installation

- (A) : Front
- (C) : Wall height (H)
- (B) : Must be open

- When multiple units are installed adjacent to each other, secure enough space to allow for air circulation and passageways between groups of units as shown in the figures.
- At least two sides must be left open.
- As with the single installation, add the height that exceeds the height limit <h> to the figures that are marked with an asterisk.
- If there is a wall at both the front and the rear of the unit, install up to six units consecutively in the side direction and provide a space of 1000mm [33-3/8] or more as inlet space/passage space for each six units.



(Unit : mm [in.])

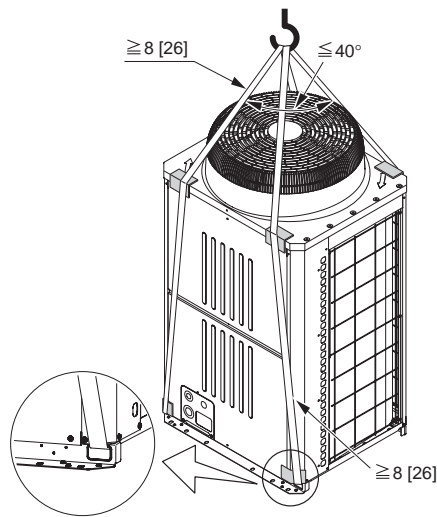
4. OUTDOOR INSTALLATION

4-3. Piping Direction

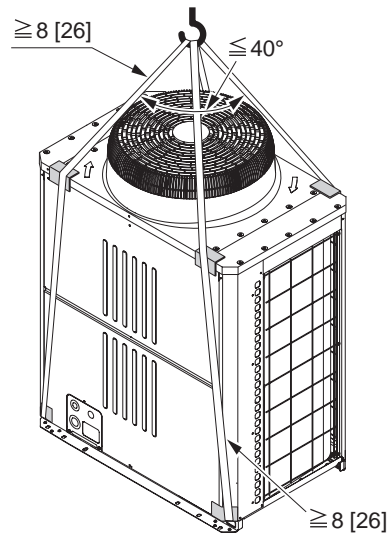
4-3-1. Lifting method

- When lifting the unit with ropes, run the ropes under the unit and use the lifting hole.
- Support the unit at four points with two ropes, and avoid giving mechanical shock.
- Suspension rope angle must be 40° or less, so as to avoid compressing fan guard.
- Use two ropes, each at least 8m [26 ft.] in length
- Use ropes strong enough to support the weight of the unit.
- Always suspend the unit from four corners. (It is dangerous to suspend a unit from two corners and must not be attempted.)
- Use protective pads to keep the ropes from scratching the panels on the unit.

① HP72



② HP96



CAUTION

Exercise caution when transporting products.

- Products weighing more than 20 kg [45 LBS] should not be carried alone.
- Do not carry the product by the PP bands.
- To avoid the risk of injury, do not touch the heat exchanger fins.
- Plastic bags may pose a risk of choking hazard to children. Tear plastic bags into pieces before disposing of them.
- When lifting and transporting outdoor units with ropes, run the ropes through lifting hole at the unit base. Securely fix the unit so that the ropes will not slide off, and always lift the unit at four points to prevent the unit from falling.

4. OUTDOOR INSTALLATION

4-3-2. Installation

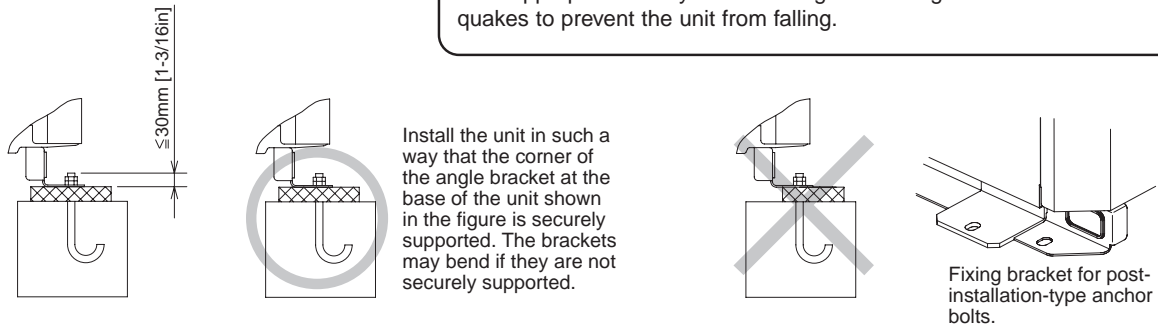
- Secure the unit with anchor bolts as shown in the figure below so that the unit will not topple over with strong wind or during an earthquake.
- Install the unit on a durable base made of such materials as concrete or angle steel.
- Take appropriate anti-vibration measures (e.g., vibration damper pad, vibration isolation base) to keep vibrations and noise from being transmitted from the unit through walls and floors.
- Install the unit in such a way that the corner of the angle bracket at the base of the unit shown in the figure below is securely supported.
- Install the anchor bolt in such a way that the top end of the anchor bolt do not stick out more than 30 mm [1-3/16in].
- This unit is not designed to be anchored with post-installation-type anchor bolts, although by adding fixing brackets anchoring with such type of anchor bolts becomes possible.

⚠ WARNING

Properly install the unit on a surface that can withstand the weight of the unit. Unit installed on an unstable surface may fall and cause injury.

⚠ WARNING

Take appropriate safety measures against strong winds and earthquakes to prevent the unit from falling.



Take into consideration the durability of the base, water drainage route (Drain water is discharged from outdoor units during operation.), piping route, and wiring route when performing foundation work.

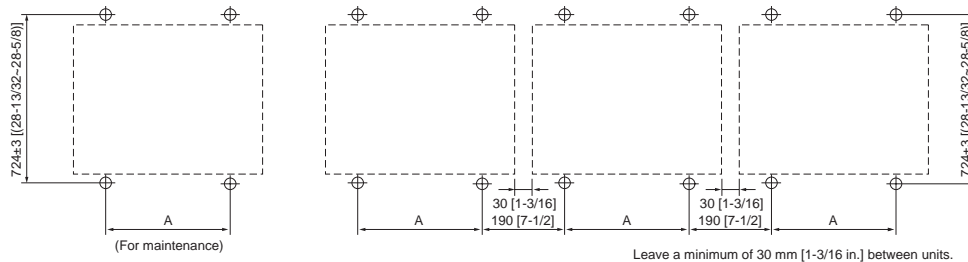
4-3-3. Anchor bolt positions

<HP72, 96>

• Individual installation

• Collective installation

(Unit : mm [in.])



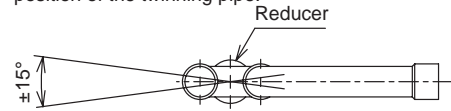
PUHY	HP72	HP96
A	760±2 [29-15/16(29-27/32-30)]	1060±2 [41-3/4(41-21/32-41-13/16)]

4. OUTDOOR INSTALLATION

4-3-6. Twinning on the outdoor unit side

- The tilt angle of the twinning pipe
The tilt angle of the twinning pipe must be within $\pm 15^\circ$ with the horizontal plane.
Tilting the twinning pipe more than specified will cause damage to the unit.
- The length of the straight part of the pipe before the branching
For the twinning kit, always use the accessory piping parts.
The length of the straight part of pipe connected in front of the twinning pipe must be 500 mm (19 in) or longer.
(Connect the field piping so that the length of the straight part of pipe connected in front of the twinning pipe can be 500 mm (19 in) or longer.)
If the length is less than 500 mm (19 in), it will cause damage to the unit.

Note: See the following drawing for the fitting position of the twinning pipe.



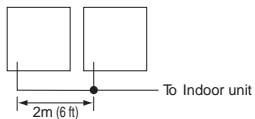
The tilt angle of the reducer should be within $\pm 15^\circ$ with the horizontal plane.

- The piping connection

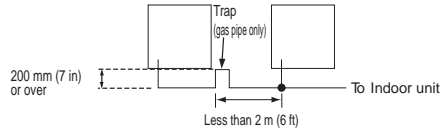
When connecting the twinning kit to the outdoor unit, note the following:

If the length of piping from the twinning kit to the outdoor unit is more than 2 m (6 ft), install a trap within 2 m (6 ft) from the outdoor unit. The height of the trap must be 200 mm (7 in) or higher.

<2 m (6 ft) or less>

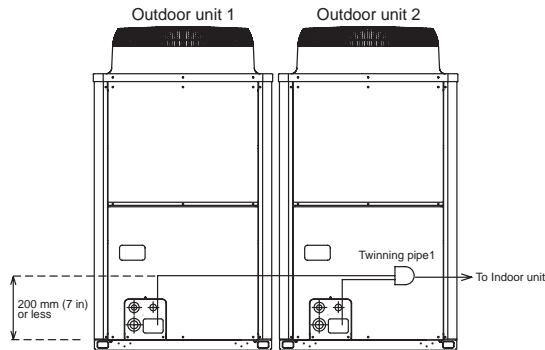


<More than 2 m (6 ft)>

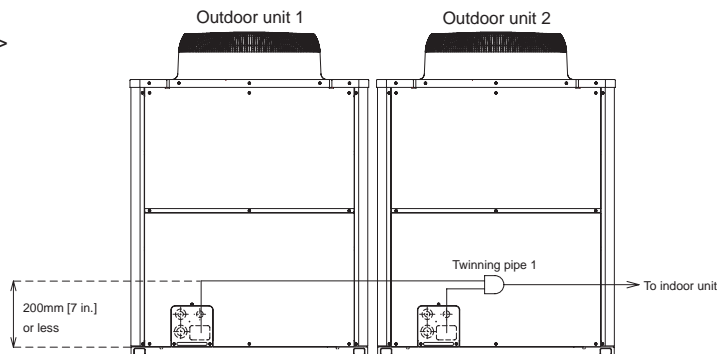


When installing the twinning kit in a higher position than the outdoor unit base, make sure that the twinning kit is installed in a position lower than 200 mm (7 in) from the outdoor unit base.

<PUHY-HP144TSJMU-A>



<PUHY-HP192TSJMU-A>

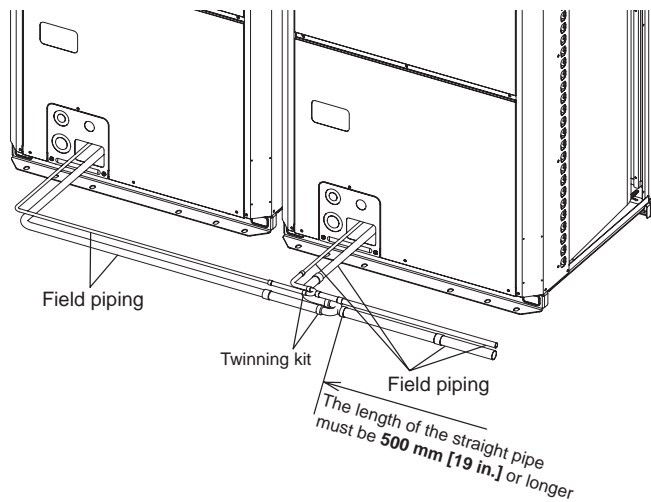


4. OUTDOOR INSTALLATION

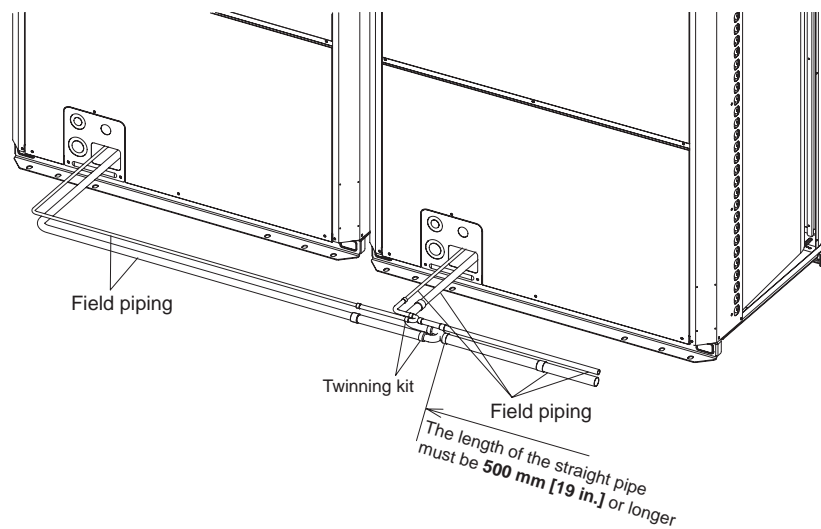
4-3-7. Twinning on the outdoor unit side

See the following drawing for connecting the pipes between the outdoor units.

<PUHY-HP144TSJMU-A>



<PUHY-HP192TSJMU-A>



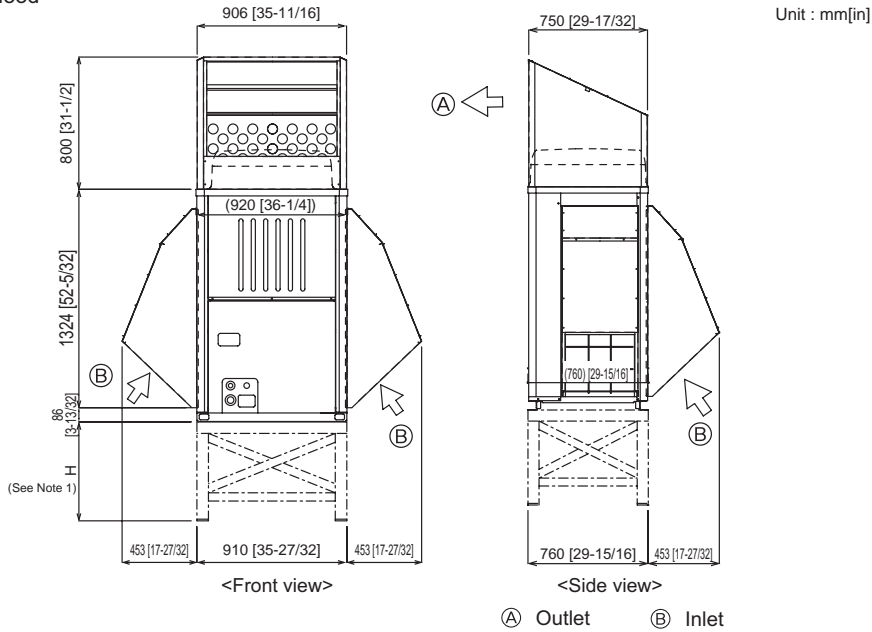
CAUTION

The length of the straight pipe must be 500mm[19in.] or longer.
If not, it may cause improper operation.

4. OUTDOOR INSTALLATION

4-4. Weather Countermeasures

- Snow hood

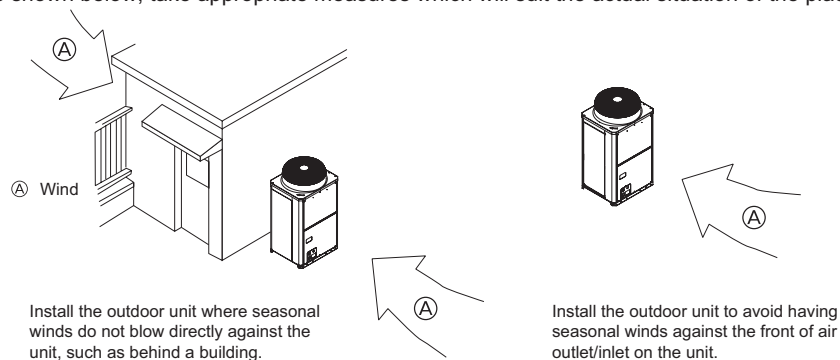


Note:

1. Height of frame base for snow damage prevention (H) 12 inches above the average snowfall. Width of frame base shall not exceed that of the unit. The frame base shall be made of angle steel, etc., and designed so that snow and wind slip through the structure. (If frame base is too wide, snow will be accumulated on it.)
2. Install unit so that wind will not directly lash against openings of inlet and outlet ducts.
3. Build frame base at customer referring to this figure.
Material: Galvanized steel plate 1.2T [1/16 in T]
Painting: Overall painting with polyester powder
Color: Munsell 5Y8/1 (same as that of unit)
4. When the unit is used in a cold region and the heating operation is continuously performed for a long time when the outside air temperature is below freezing, install a heater to the unit base or take other appropriate measures to prevent water from freezing on the base.

Countermeasure to wind

Referring to the figure shown below, take appropriate measures which will suit the actual situation of the place for installation.

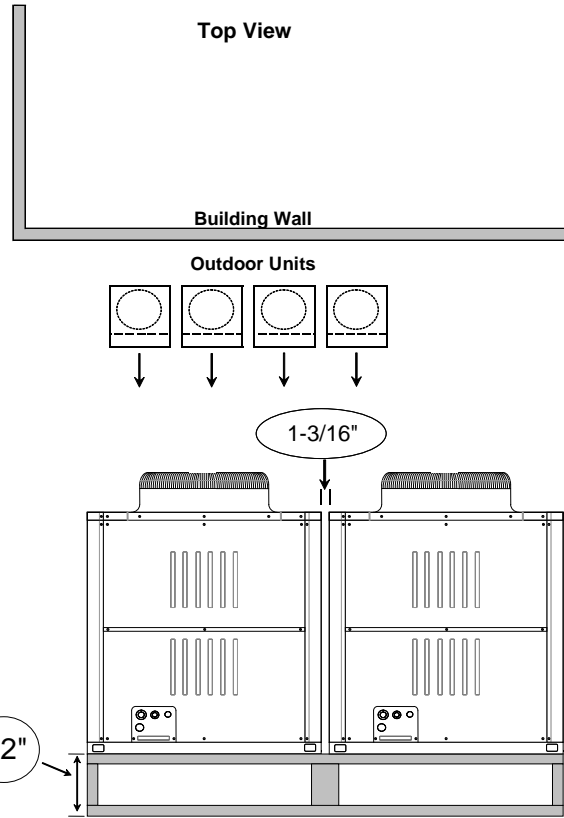
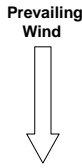


4. OUTDOOR INSTALLATION

4-5. Low Ambient Kit Application Guidelines

General Unit Placement and Clearances

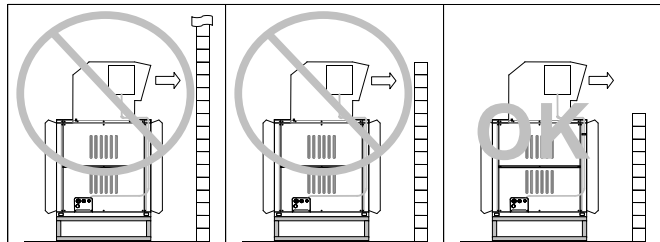
- Outdoor units should be located in an area protected from prevailing winds.
- In high wind locations, it may be advisable to install the outdoor units within a walled area.
- Hood discharge should be directed away from or perpendicular to the prevailing winds. Do not direct the hood discharge towards prevailing winds.
- When using the low ambient components, add an additional 7" to the standard mounting clearances.



Note:

Equipment supports must elevate the unit at least 12" above the average expected snow depth or 12" above the ground, whichever is higher. The equipment supports must be an open construction to minimize snow drifting and/or ice formation during defrost.

If the units are surrounded by an enclosure, the hood must be positioned that the air is directed out and over the walls to prevent air recirculation.



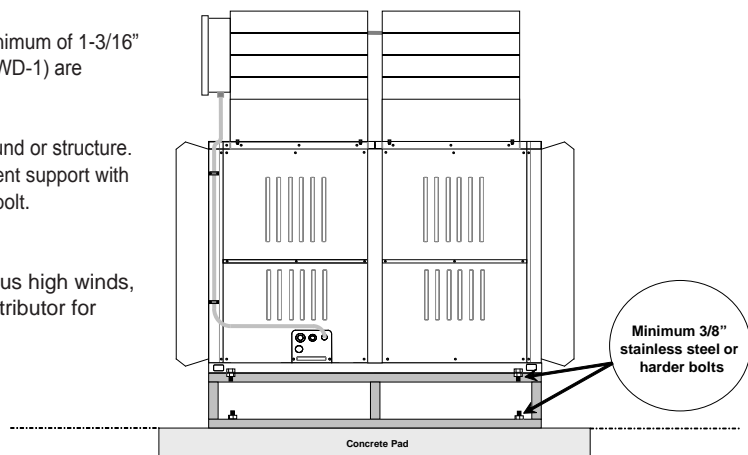
Equipment Supports

When modules are combined, they should be placed a minimum of 1-3/16" apart. By doing so, only one set of side wind deflectors (SWD-1) are required per group of modules.

The equipment support must be firmly attached to the ground or structure. The outdoor unit must be properly attached to the equipment support with 3/8" stainless steel or equal strength to at least a grade 5 bolt.

Note:

If the outdoor unit is located in an area with continuous high winds, additional braced may be required. Contact your distributor for assistance.



4. OUTDOOR INSTALLATION

Additional Rooftop Mounting Guidelines

Ground-level installation is preferred for outdoor units that include a low ambient kit. If ground-level installation is not possible, follow general, as well as all additional installation guidelines for rooftop mounting. If you have any questions, please contact your distributor.

Note:

Low ambient hood(s) increase the overall height of the outdoor units and make them more susceptible to wind stresses. Follow all guidelines when using these for rooftop applications.

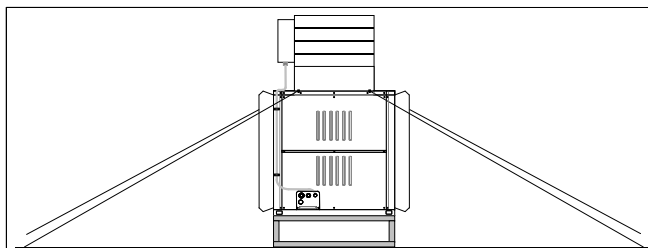
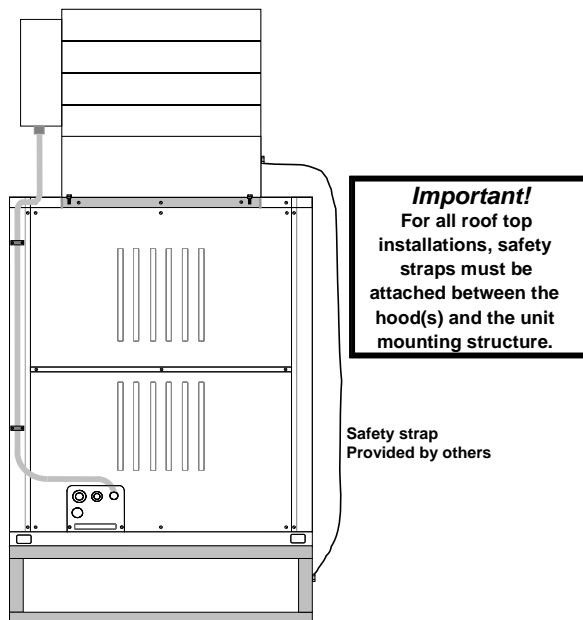
- Straps must be attached to the hood where they will not interfere with the movement of the dampers.

Note:

For all rooftop installation, safety straps must be attached between the hood(s) and the equipment support structure. Straps should be 3/16" (or larger) vinyl-coated cables.

- Straps must be connected to both the hood and mounting structure through using 1/4" diameter (or larger) bolt.
- The outdoor unit and equipment support should be firmly attached to the structure. If the equipment support does not attach to the structure, refer to the support manufacturer's guidelines for proper size and construction.

Depending on location, exposure and other factors influencing wind access or blockage, additional support may be required such as shown at right. Contact your distributor for assistance.



5. STANDARD AND SEACOAST (BS) PROTECTION TREATMENT

5-1. H2i Y-Series

Component	Base Material	Standard Models	Seacoast Protection Models (-BS)	Surface Treatment	Coating Thickness	
					External Surface	Internal Surface
External Panel Base	Alloyed Galvanized Steel Sheet	●	●	Thermoset Polyester-resin Powder Coating	≥70μm	≥70μm
External Front Panel	Alloyed Galvanized Steel Sheet	●		Polyester-resin Coating	≥15μm	≥5μm
			●	Thermoset Polyester-resin Powder Coating	≥85μm	≥75μm
Pillar	Alloyed Galvanized Steel Sheet	●		Polyester-resin Coating	≥30μm	
			●	Thermoset Polyester-resin Powder Coating	≥70μm	≥70μm
Compressor Cover	Galvanized Steel Sheet	●		No Treatment		
	Galvanized Aluminum Sheet		●	Thermoset Polyester-resin Powder Coating	≥70μm	≥70μm
Fin Guard	Steel Wires	●	●	Weather-resistant Polypropylene-resin Coating	≥300μm	≥300μm
Fan Guard and Drum	Weather-resistant Polypropylene Plastic	●	●	No Treatment		
Fan	Weather-resistant Acrylic Nitrile Styrene Plastic	●	●	No Treatment		
Fan Motor Frame	Galvanized Steel Sheet	●	●	No Treatment		
Fan Motor Shaft	High-carbon S35C Steel	●	●	Rust-prevention Coating		
Fan Motor Support	Galvanized Steel Sheet	●		No Treatment		
			●	Thermoset Polyester-resin Powder Coating	≥70μm	≥70μm
Heat Exchanger (Fin Only)	Aluminum Plate	●		Cellulose- and Polyurethane-resin Coating (<i>Blue Fin</i>) (no unusual rust development to 480 hours)	≥1μm	
			●	Cellulose- and Polyurethane-resin Coating (<i>Blue Fin</i>) (no unusual rust development to 960 hours)	≥1 - 1.5μm	
Electrical Parts Box	Galvanized Steel Sheet	●		No Treatment		
	Galvanized Aluminum Sheet		●	Thermoset Polyester-resin Powder Coating	≥70μm	
Printed Circuit Board	Epoxy Resin	●		No Treatment		
			●	Polyurethane Coating	≥10μm	
Screws	Steel	●	●	Zinc-nickel Alloy Plating with a Chromate Film	≥5μm	

2010 H2i Y-SERIES SYSTEM DESIGN

Application Guide

	Distance from the Sea		
	984' (300m)	1,640' (500m)	3,281' (1km)
Direct Exposure to Sea Breezes			
Facing Inland	Seacoast Protection (-BS) Models	Standard Models	
Facing Sea	Seacoast Protection (-BS) Models		
On an Island	Seacoast Protection (-BS) Models		
Indirect Exposure to Sea Breezes			
Facing Inland	Seacoast Protection (-BS) Models	Standard Models	
Facing Sea	Seacoast Protection (-BS) Models		
On an Island	Seacoast Protection (-BS) Models		

For optimum performance, follow the cautions listed below.

1. Avoid installing the unit in a location that is subjected to direct sea winds.
2. Do not attach a sunshade to the unit. Let the rain wash away any salt residue that may adhere to the unit.
3. Unit should be installed following instructions for proper operation and to ensure optimum water drainage.
4. Periodically wash the unit.
5. If the panels become scratched, repair as soon as possible.
6. Inspect the unit at regular intervals. Paint the unit or replace parts when necessary.

Material	Thermoset Polyester-resin Powder Coating	Cellulose- and Polyurethane-resin Coating (<i>Blue Fin</i>)	
Test Conditions	Salt-spray Test Method: JIS K2371 based on ISO9227	Salt-spray Test Method: JIS Z2371 based on ISO9227	
Test Results	Conform to JRA9002 Criteria (960-hour test)	No unusual rust development to 480 hours	No unusual rust development to 960 hours

"Blue Fin" treatment is an anti-corrosion treatment that is applied to the condenser coil to protect it against airborne contaminants.

6. CAUTIONS

The installer and/or air-conditioning system specialist shall follow local safety regulations and standards regarding refrigerant leakage. The following standard may be applicable if a local regulation or standard is available.

6-1. Refrigerant Properties

R410A refrigerant is harmless and incombustible. R410A is heavier than the indoor air in density. Leakage of the refrigerant in a room has possibility to lead to a hypoxia situation. Therefore, the critical concentration specified below shall not be exceeded even if the leakage happens.

• Critical concentration

Critical concentration is the maximum refrigerant concentration at which no harm would occur if immediate measures are taken when refrigerant leakage happens.

Critical concentration of R410A: 0.30kg/m³ [0.0187 lbs./ft.³]

(The weight of refrigeration gas per 1 m³ [1 ft.³] air conditioning space.);

* The critical concentration is per ISO5149, EN378-1 (other codes and standards may establish different values for critical concentration).

For CITY MULTI systems, the concentration of refrigerant leaked should not exceed the critical concentration in any situation.

6-2. Confirm the Critical Concentration Levels and Perform Countermeasures

The maximum refrigerant leakage concentration (Rmax) is defined as the result of the possible maximum refrigerant weight (Wmax) leaked into a room divided by its room capacity (V). The refrigerant weight includes its original charge and additional charge at the site. The additional charge is calculated according to "PUHY-P-T(S)HMU/Y(S)HMU's refrigerant charging calculation", and shall not be over charged at the site. Procedure 6-2-1~3 tells how to confirm maximum refrigerant leakage concentration (Rmax) and how to take countermeasures against a possible leakage.

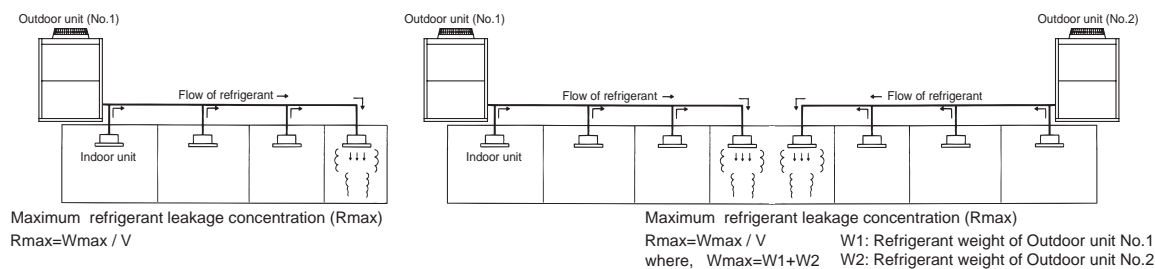


Fig. 6-1 The maximum refrigerant leakage concentration

6-2-1. Find the room capacity (V),

If a room having total opening area more than 0.15% of the floor area at a low position with another room/space, the two rooms/space are considered as one. The total space shall be added up.

6-2-2. Find the possible maximum leakage (Wmax) in the room. If a room has Indoor unit(s) from more than 1 Outdoor unit, add up the refrigerant of the Outdoor units.

6-2-3. Divide (Wmax) by (V) to get the maximum refrigerant leakage concentration (Rmax).

6-2-4. Find if there is any room in which the maximum refrigerant leakage concentration (Rmax) is over 0.30kg/m³ [0.0187 lbs./ft.³].

If no, then the CITY MULTI is safe against refrigerant leakage.

If yes, following countermeasure is recommended to do at site.

Countermeasure 1: Let-out (making V bigger)

Design an opening of more than 0.15% of the floor area at a low position of the wall to let out the refrigerant whenever leaked.

e.g. make the upper and lower seams of door big enough.

Countermeasure 2: Smaller total charge (making Wmax smaller)

e.g. Avoid connecting more than 1 Outdoor unit to one room.

e.g. Using smaller model size but more Outdoor units.

e.g. Shorten the refrigerant piping as much as possible.

e.g. Remove unit from space.

Countermeasure 3: Ventilation air in from the ceiling.

As the density of the refrigerant is bigger than that of the air. Ventilation air from the ceiling is better than air exhausting from the ceiling.

Ventilation air supply solution refers to Fig. 6-2~3.

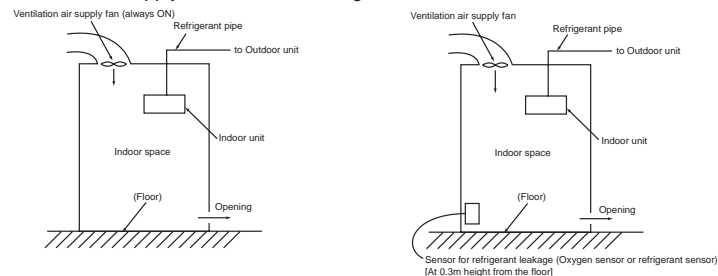


Fig. 6-2. Ventilation air supply always ON

Fig. 6-3. Ventilation air supply upon sensor action

Note 1. Countermeasure 3 should be done in a proper way in which the ventilation air supply shall be on whenever the leakage happens.

Note 2. In principle, MITSUBISHI ELECTRIC requires proper piping design, installation and air-tight testing after installation to avoid leakage happening.

In the area should earthquake happen, anti-vibration measures should be fully considered.

The piping should consider the extension due to the temperature variation.